

The Refrigeration Service Engineer

TECHNOLOGY DEPT.
VOL. 13 NO. 8

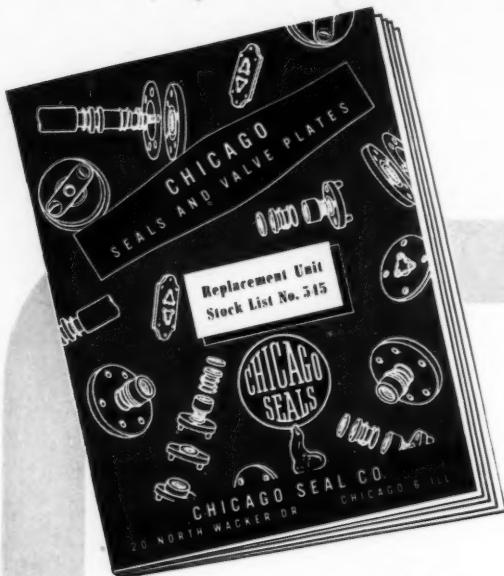


PUBLIC LIBRARY AUGUST, 1945

AUG 22 1945
DETROIT



REFRIGERATION SERVICE HAS GROWN UP •
GOING INTO BUSINESS FOR YOURSELF •
PRICES ON USED REFRIGERATORS AMENDED •



YOU MAY NEED MORE COPIES!
One for Every Service Man on Your Staff

This new CHICAGO SEAL PRICE LIST is eight pages of useful information . . . a handy illustrated reference book to have along on the job, and to refer to in desk work. It tells you which Chicago Seal and Valve Plate to use on every make of compressor, and gives you the price as well. A copy has already been mailed to every service organization on our list. If you did not receive a copy, or if you want additional copies, just drop us a post card now stating how many you need. We will gladly send them to you, FREE.





REFRIGERATION'S BIGGEST PROBLEM!

DRYING POWER OF VARIOUS MATERIALS

Drier	Refrigerant	Liquid or Vapor	Max. % Residual Moisture (Initial water concentration) .25% .02%
ACTIVATED ALUMINA	Sulfur Dioxide	L .15	.005
	Methyl Chloride	V .01	.006
SILICA GEL	Sulfur Dioxide	L .15	.006
	Methyl Chloride	V .01	.004
DRIERITE (Calcium Sulphate)	Sulfur Dioxide	L .15	.009
	Methyl Chloride	V .05	.003
CALCIUM CHLORIDE <chem>CaCl2</chem>	Sulfur Dioxide	L .09	.013
	Methyl Chloride	V .04	.005
CALCIUM OXIDE <chem>CaO</chem>	Sulfur Dioxide	L .20	—
	Methyl Chloride	V .15	—
BARIUM OXIDE <chem>BaO</chem>	Sulfur Dioxide	L .20	.017
	Methyl Chloride	V .05	.006

IMPORTANT QUESTIONS IN SELECTING A DRIER

1. Does the material dry the refrigerant below the corrosion limits when placed in the liquid line? In the suction (vapor) line?
2. Does the material dry the refrigerant below the limits for ice formation with methyl chloride?
3. Does the material accomplish the drying in one passage of the refrigerant, or is it slow, i.e., requires several passages?
4. Does the material deteriorate in physical character in handling or when it removes water from the refrigerant?
5. Does the oil affect the drier adversely?
6. Does the drier corrode?

FOR REFRIGERANTS—SEE YOUR ANSUL JOBBER

ANSUL CHEMICAL COMPANY

MARINETTE, WISCONSIN

AGENTS FOR KINETIC'S "FREON-11," "FREON-12" AND "FREON-22"



SEND FOR THIS BOOK TODAY!

Here are practical answers to the most common refrigerant questions refrigeration men ask. This 8 1/2" x 11" book makes a handy reference you will use often. It is complete and authoritative.

Send for free copy of "Ansul Refrigerants" (3rd Edition)—NOW.



*REG. U.S. PAT. OFF.

THESE FEATURES OF "DL"

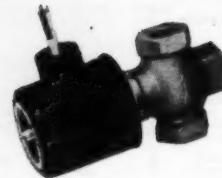
SOLENOID

VALVES

large power to lift against high pressure, guide tube mini-

DISITIVE strong
and
SERVICED—Can be
cleaned,
EASILY without disconnecting.
SERVICING
REPLACEMENT
DRAWINGS
CLEANED
REPLACES
ALL PARTS
AND
WELDING
JOINTS
ARE
MADE
BY
TIG
WELDING
METHOD.

ECONOMICALLY designed parts if required "DL" solenoid valves have the advantage of these features.



No. 652-3—This table sets up new values for ultimate strength of steel beams 1 1/8" and 1 1/2" thick, and will not affect beams 1 1/4" and 1 3/4" thick. The new values apply to beams 1 1/8" and 1 1/2" thick having a capacity equal to 100% of the old values at stresses of 10,000, 12,000, 14,000, 16,000, 18,000, 20,000, 22,000, 24,000, 26,000, 28,000, 30,000, 32,000, 34,000, 36,000, 38,000, 40,000, 42,000, 44,000, 46,000, 48,000, 50,000, 52,000, 54,000, 56,000, 58,000, 60,000, 62,000, 64,000, 66,000, 68,000, 70,000, 72,000, 74,000, 76,000, 78,000, 80,000, 82,000, 84,000, 86,000, 88,000, 90,000, 92,000, 94,000, 96,000, 98,000, 100,000, 102,000, 104,000, 106,000, 108,000, 110,000, 112,000, 114,000, 116,000, 118,000, 120,000, 122,000, 124,000, 126,000, 128,000, 130,000, 132,000, 134,000, 136,000, 138,000, 140,000, 142,000, 144,000, 146,000, 148,000, 150,000, 152,000, 154,000, 156,000, 158,000, 160,000, 162,000, 164,000, 166,000, 168,000, 170,000, 172,000, 174,000, 176,000, 178,000, 180,000, 182,000, 184,000, 186,000, 188,000, 190,000, 192,000, 194,000, 196,000, 198,000, 200,000, 202,000, 204,000, 206,000, 208,000, 210,000, 212,000, 214,000, 216,000, 218,000, 220,000, 222,000, 224,000, 226,000, 228,000, 230,000, 232,000, 234,000, 236,000, 238,000, 240,000, 242,000, 244,000, 246,000, 248,000, 250,000, 252,000, 254,000, 256,000, 258,000, 260,000, 262,000, 264,000, 266,000, 268,000, 270,000, 272,000, 274,000, 276,000, 278,000, 280,000, 282,000, 284,000, 286,000, 288,000, 290,000, 292,000, 294,000, 296,000, 298,000, 300,000, 302,000, 304,000, 306,000, 308,000, 310,000, 312,000, 314,000, 316,000, 318,000, 320,000, 322,000, 324,000, 326,000, 328,000, 330,000, 332,000, 334,000, 336,000, 338,000, 340,000, 342,000, 344,000, 346,000, 348,000, 350,000, 352,000, 354,000, 356,000, 358,000, 360,000, 362,000, 364,000, 366,000, 368,000, 370,000, 372,000, 374,000, 376,000, 378,000, 380,000, 382,000, 384,000, 386,000, 388,000, 390,000, 392,000, 394,000, 396,000, 398,000, 400,000, 402,000, 404,000, 406,000, 408,000, 410,000, 412,000, 414,000, 416,000, 418,000, 420,000, 422,000, 424,000, 426,000, 428,000, 430,000, 432,000, 434,000, 436,000, 438,000, 440,000, 442,000, 444,000, 446,000, 448,000, 450,000, 452,000, 454,000, 456,000, 458,000, 460,000, 462,000, 464,000, 466,000, 468,000, 470,000, 472,000, 474,000, 476,000, 478,000, 480,000, 482,000, 484,000, 486,000, 488,000, 490,000, 492,000, 494,000, 496,000, 498,000, 500,000, 502,000, 504,000, 506,000, 508,000, 510,000, 512,000, 514,000, 516,000, 518,000, 520,000, 522,000, 524,000, 526,000, 528,000, 530,000, 532,000, 534,000, 536,000, 538,000, 540,000, 542,000, 544,000, 546,000, 548,000, 550,000, 552,000, 554,000, 556,000, 558,000, 560,000, 562,000, 564,000, 566,000, 568,000, 570,000, 572,000, 574,000, 576,000, 578,000, 580,000, 582,000, 584,000, 586,000, 588,000, 590,000, 592,000, 594,000, 596,000, 598,000, 600,000, 602,000, 604,000, 606,000, 608,000, 610,000, 612,000, 614,000, 616,000, 618,000, 620,000, 622,000, 624,000, 626,000, 628,000, 630,000, 632,000, 634,000, 636,000, 638,000, 640,000, 642,000, 644,000, 646,000, 648,000, 650,000, 652,000, 654,000, 656,000, 658,000, 660,000, 662,000, 664,000, 666,000, 668,000, 670,000, 672,000, 674,000, 676,000, 678,000, 680,000, 682,000, 684,000, 686,000, 688,000, 690,000, 692,000, 694,000, 696,000, 698,000, 700,000, 702,000, 704,000, 706,000, 708,000, 710,000, 712,000, 714,000, 716,000, 718,000, 720,000, 722,000, 724,000, 726,000, 728,000, 730,000, 732,000, 734,000, 736,000, 738,000, 740,000, 742,000, 744,000, 746,000, 748,000, 750,000, 752,000, 754,000, 756,000, 758,000, 760,000, 762,000, 764,000, 766,000, 768,000, 770,000, 772,000, 774,000, 776,000, 778,000, 780,000, 782,000, 784,000, 786,000, 788,000, 790,000, 792,000, 794,000, 796,000, 798,000, 800,000, 802,000, 804,000, 806,000, 808,000, 810,000, 812,000, 814,000, 816,000, 818,000, 820,000, 822,000, 824,000, 826,000, 828,000, 830,000, 832,000, 834,000, 836,000, 838,000, 840,000, 842,000, 844,000, 846,000, 848,000, 850,000, 852,000, 854,000, 856,000, 858,000, 860,000, 862,000, 864,000, 866,000, 868,000, 870,000, 872,000, 874,000, 876,000, 878,000, 880,000, 882,000, 884,000, 886,000, 888,000, 890,000, 892,000, 894,000, 896,000, 898,000, 900,000, 902,000, 904,000, 906,000, 908,000, 910,000, 912,000, 914,000, 916,000, 918,000, 920,000, 922,000, 924,000, 926,000, 928,000, 930,000, 932,000, 934,000, 936,000, 938,000, 940,000, 942,000, 944,000, 946,000, 948,000, 950,000, 952,000, 954,000, 956,000, 958,000, 960,000, 962,000, 964,000, 966,000, 968,000, 970,000, 972,000, 974,000, 976,000, 978,000, 980,000, 982,000, 984,000, 986,000, 988,000, 990,000, 992,000, 994,000, 996,000, 998,000, 1000,000.

WRITE YOUR COPY FOR OF THIS SERVICE the first of a series

This is the bulletin, **Lumber**, of service Detroit Publishing Company. They catered on $8\frac{1}{2}$ x printed, punched paper, standard binder. Copies had on request, car yours.

177, *Journal H. P. 1.*

Chemical REFRIGERANT *

Drying

Two Types of two general types.
The common "Type" is packed with surface tension on a material which has an attraction for the surface.

DETROIT LUBRICATOR COMPANY

General Offices: 8000 TRINITY AVENUE DETROIT 8 MICHIGAN

Division of AMERICAN RADIATOR

Standard Sanitary Corporation, Representatives - RAILWAY AND ENGINEERING
 & MANUFACTURERS, MONTREAL, TORONTO, WINNIPEG.

Intergenerational Controls • Engine Safety Controls • Safer

1 Burner Accessories • "Detroit" Expansion Valve

COLLECTOR'S GUIDE

卷之三

卷之三

SERVICE ENGINEER

Service Engineers Should Know . . .



THE PURITY OF "VIRGINIA" SULFUR DIOXIDE IS CAREFULLY GUARDED

— the content of each cylinder — large or small — is analyzed 2 separate times.

1. CLEANLINESS TEST



A measured sample drawn from each container must be water-white in color and when boiled to dryness must leave no dirt, oil or other residue. This test detects undesirable impurities.

2. MOISTURE TEST



A sample of known weight from each cylinder is passed through P_2O_5 (a dessicant). Moisture calculated by the increased weight of the tube must not exceed 50 parts per million; low moisture prevents freeze-ups and oil-sludging.

EXTRA PRECAUTIONS

To prevent any possible contamination of "Extra Dry Esotoo" every cylinder is dry cleaned and finally rinsed with pure SO_2 before filling.

Each cylinder valve is inspected and reserviced to assure trouble-free operation — this saves time and money for the service engineer.

The name "EXTRA DRY ESOTOO" on the cylinder is your guarantee of quality. Sold by refrigeration supply jobbers everywhere.



VIRGINIA Smelting Co.

WEST NORFOLK, VA.

78 BEAVER ST., NEW YORK 5 :: 131 STATE ST., BOSTON 4
Agents for Kinetic's "Fmon-12" — "Fmon-22" — "Fmon-11"

Here is the groove in Imperial Triple-Seal Fittings that brings you new, extra protection against leakage in refrigeration tubing connection work. When the flare is drawn up against this groove the copper tubing is extruded into the groove making a tight, Triple-Sealed joint. This joint will remain LEAKPROOF even though the face of the seat may be nicked or marred.

Flats are placed on elbows and tees. This gives a wrench hold, eliminating the possibility of distorting the body in gripping the fitting, and also speeds up work materially.



The flare extrudes into groove making leak-proof joint



Tees, nuts, elbows and crosses are made from brass forgings. This assures a fine grain structure, freedom from internal stress and high tensile strength. Female couplings and cap nuts are made from extruded bronze rod not subject to season cracking.

The threads and seats of Imperial Flared Fittings are protected against possible damage before use by a protecting sleeve as shown here.



IMPERIAL TRIPLE-SEAL Flared Fittings



THE IMPERIAL BRASS MANUFACTURING CO.
534 South Racine Ave. Chicago 7, Illinois, U. S. A.

CALL YOUR ALCO JOBBER

-for better Valves, Tools,
Supplies and Service



There's a refrigeration jobber near you who stocks ALCO Valves. That means a good firm to deal with — carefully selected for service on a par with ALCO quality. For greater satisfaction in every way, rely on your dependable ALCO jobber.

ABILENE, TEX.

Refrigeration Sup. & Elec. Co.

AKRON, OHIO

Percy G. Hanson

ALBUQUERQUE, N. M.

Radio Parts Co.

ASHEVILLE, N. C.

Freck Radio & Supply

ATLANTA, GA.

Bowen Refrig. Supplies, Inc.

GRAVES REFRIGERATION

Parks & Hull Appliance Corp.

BEAUMONT, TEX.

Standard Brass & Mfg. Co.

BILLINGS, MONT.

Taylor Refrig. & Appl. Co.

BIRMINGHAM, ALA.

Refrig. Sup. Distributor

BOSTON, MASS.

A. E. Borden Co.

Melchior, Armstrong, Dessa

DAVENPORT, IOWA

Republic Electric Co.

DES MOINES, IOWA

Dennis Refrigeration Sup. Co.

Thermal Co., Inc.

DETROIT, MICH.

Rioelle Supply Co.

EVANSVILLE, IND.

Bullock Refrig. Sup. Co.

FLINT, MICH.

Shad Radio Specialties

FRESNO, CALIF.

Arbell Refrigeration Sup. Co.

GARY, IND.

Engineering Specialty Co., Inc.

GRAND RAPIDS, MICH.

B. F. Harris & Sons

Refrigeration Sup. Co.

GREAT FALLS, MONT.

Thermal Co., Inc.

RICHMOND, IND.

F. H. Langenkamp Co.

RICHMOND, VA.

A. R. Tiller, Inc.

SACRAMENTO, CALIF.

Assoc. Refrig. & Equip. Co.

SAGINAW, MICH.

J. George Fischer & Sons, Inc.

ST. JOSEPH, MO.

H. Ehrlich & Sons Mfg. Co.

ST. LOUIS, MO.

Bass & Copper Sales Co.

N. O. Nelson Co.

ST. PAUL, MINN.

Thermal Co., Inc.

SALT LAKE CITY, UTAH

Gen. Electric Supply Corp.

Walter B. Loyd Co.

SAN ANTONIO, TEX.

United Refrigeration Co.

Westbrook Carbur. Elec. Co.

SAN DIEGO, CALIF.

L. B. Marsh Refrig. Co.

United Refrigeration Co.
Westbrook Carb. Elec. Co.
SAN DIEGO, CALIF.
L. B. Marsh
L. B. Marsh

J. B. Thomas Co., Inc.
NEWARK, N. J.
T. W. Binder Co.
Wallwork Brothers

TAYLOR FALLS, MINN.
HARTFORD, CONN.
Joseph Simons Co.

BOSTON, MASS.
A. E. Borden Co.
Welchior, Armstrong, Dessau

BROOKLYN, N. Y.
Welchior, Armstrong, Dessau
BUFFALO, N. Y.
Foster Supply Co.
CEDAR RAPIDS, IOWA
Thermal Co., Inc.
CHARLESTON, S. C.
Allen & Webb
Corvette's Supply Co.
CHARLOTTE, N. C.
Bowen Refrig. Supplies, Inc.
CHICAGO, ILL.
Chase Refrigeration Sup. Co.
Fred C. Kramer Co.
Refrigeration Supply Jobbers
CINCINNATI, OHIO
Williams & Co., Inc.
CLEVELAND, OHIO
Refrigeration Supplies Co.
Williams & Co., Inc.
COLUMBUS, OHIO
Mason Supply Co.
Williams & Co., Inc.
DALLAS, TEX.
The Electromotive Corp.
Snell Refrigeration Sup. Co.

BROOKLYN, N. Y.
Melchior, Armstrong, Dessau
HOUSTON, TEX.
Standard Brass & Mfg. Co.
Walter Refrig. Supply Co.
INDIANAPOLIS, IND.
Central Supply Co.
F. H. Langenkamp Co.
JACKSONVILLE, FLA.
Bowen Refrig. Supplies, Inc.
Refrigeration Supply Corp.
KANSAS CITY, MO.
Forslund Pump & Mach. Co.
Superior Refrig. Supply Co.
LEXINGTON, KY.
United Service Co.
LINCOLN, NEB.
Wichham Supply Co.
LITTLE ROCK, ARK.
Refrigeration Supply Co.
LONG BEACH, CALIF.
L. B. Marsh Allied Refrig. Co.
LOS ANGELES, CALIF.
Authorized Supply Co.
Pacific Metals Co., Ltd.

NEW HAVEN, CONN.
Resco, Inc.
NEW ORLEANS, LA.
Enochs Sales Co.
NEWPORT NEWS, VA.
Noland Co., Inc.
NEW YORK, N. Y.
Aerna Supply Co.
Melchior, Armstrong, Dessau
Paramount Electrical Sup. Co.
NORFOLK, VA.
Noland Co., Inc.
OAKLAND, CALIF.
California Refrigerator Co.
OKLAHOMA CITY, OKLA.
Midke Supply Co.
OMAHA, NEB.
Dennis Refrigeration Sup. Co.
Interstate Mach. & Sup. Co.
PASSAIC, N. J.
M. Blazer & Son
PHILADELPHIA, PA.
Electric Warehouse
Melchior, Armstrong, Dessau
Victor Sales & Supply Co.
PHOENIX, ARIZ.
State Equipment & Sup. Co.
PITTSBURGH, PA.
Williams & Co., Inc.
PORTLAND, ORE.
Jacobs & Gile, Inc.

SAN FRANCISCO, CALIF.
California Refrigerator Co.
Pacific Metals Co., Ltd.
SCRANTON, PA.
Central Service Supply Co.
SEATTLE, WASH.
L. & N Wholesalers
SHREVEPORT, LA.
Standard Brass & Mfg. Co.
SIOUX CITY, IOWA
Dennis Refrigeration Sup. Co.
SOUTH BEND, IND.
F. H. Langenkamp Co.
SPRINGFIELD, MASS.
C. P. Payson Co.
SYRACUSE, N. Y.
Central Service Supply Co.
TAMPA, FLA.
Bowen Refrig. Supplies, Inc.
UTICA, N. Y.
Veth Electric Company
VANCOUVER, B. C.
Fleck Brothers, Ltd.
WICHITA FALLS, TEX.
United Electric Service Co.
WILKES-BARRE, PA.
Gen. Radio & Electronic Co.,
WILMINGTON, N. C.
S. R. S. Distributors
YOUNGSTOWN, OHIO
Refrigeration Supplies Co.

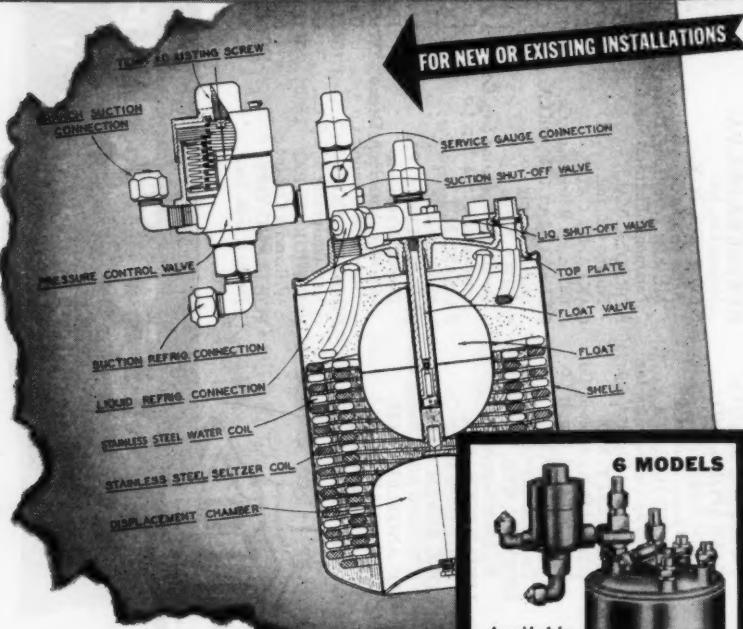
ALCO VALVE CO.

857 KINGSLAND AVE. • ST. LOUIS 5, MO.



Perfect 40° control

WITH TEMPRITE
SODA FOUNTAIN and BEVERAGE COOLERS



• When you install a Temprite soda fountain or beverage cooler you can be sure of a constant 40 deg. temperature with Temprite's patented instantaneous cooling principle and constant pressure control valve. The beverage is cooled as used and only at the rate required. Can handle either 1, 2 or 3 carbonated or non-carbonated beverages in each cooler. Write for descriptive literature today.



Available for either light, medium or heavy duty dispensing applications.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

45 PIQUETTE AVENUE

DETROIT, MICHIGAN

KE

here is another peacetime development where

PRECISION ENGINEERED

KEROTEST VALVES

—will play an
important part!



Self-Service retailing of meats and delicatessen items is a sound and proven merchandising method. Consumers like the idea because it saves time, offers a wider choice of varieties, ready-packed and ready-priced. Operators like the idea because it saves labor, provides faster turnover, larger sales, less spoilage.

Another instance where the dependability and pioneering of Kerotest advanced-engineering in the Air Conditioning and Refrigeration industry will play an important role.

KEROTEST

KEROTEST MANUFACTURING COMPANY

Pittsburgh, Pennsylvania

ORIGINATORS OF THE PACKLESS DIAPHRAGM VALVE



To Meet Your
Refrigeration needs

Arctic

REG. U.S. PAT. OFF.

DU PONT

WETMYL

METHYL CHLORIDE

99.5% PURE DRY UNIFORM

HIGH-PURITY Du Pont Methyl Chloride will fit your refrigeration requirements!

ORDER NOW—But don't hoard!

HELP YOURSELF AND OTHERS—Return

empty cylinders promptly! Your cooperation will help assure fast deliveries! E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

SPEED VICTORY—BUY MORE WAR BONDS

DU PONT METHYL CHLORIDE SPECIFICATIONS

Purity	99.5%	Methyl Chloride
Moisture	0.008%	by wgt. max.
Acid as (HCl)	0.001%	by wgt. max.
Residue on Evaporation	0.01%	by wgt. max.
Boiling Range (760mm.)	—24.6° to —23.6° C.	
Color	water white, clear	

DU PONT ELECTROCHEMICALS

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



CHECK THESE FEATURES



FIGURE 1—Shows wrenches properly applied to main body and auxiliary body for breaking the joint; the first step in disassembling the valve.

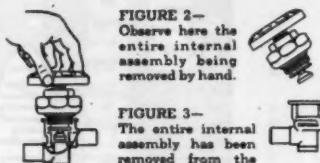


FIGURE 2—Observe here the entire internal assembly being removed by hand.

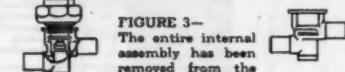


FIGURE 3—The entire internal assembly has been removed from the main body.

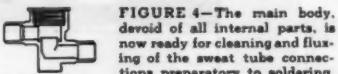


FIGURE 4—The main body, devoid of all internal parts, is now ready for cleaning and fluxing of the sweat tube connections preparatory to soldering.



FIGURE 5—Refrigerant lines are soldered to the valve connections in the usual manner. Danger of distorting internal parts is eliminated because all these parts have been removed.

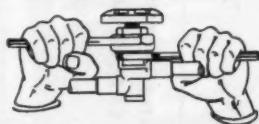
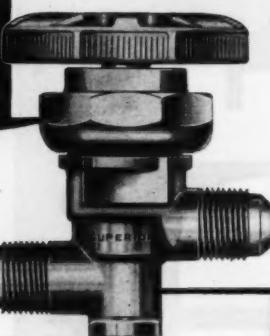


FIGURE 6—Final step is remaking the joint between the main body and auxiliary body. Note: Valve stem must be in full open position when tightening upper assembly into main body.



Superior DIAPHRAGM
PACKLESS VALVES

The only diaphragm packless valve with the internal assembly removable as one complete unit . . . a valuable feature when it comes to soldering lines to the valve connections. No need to break the diaphragm seal . . . simply remove the internal assembly *as a unit* . . . solder the connections . . . and replace the assembly. No fuss . . . no bother . . . no special tools . . . and above all, no damage to vital parts. What could be simpler!

But that's not the only important feature of these SUPERIOR DIAPHRAGM PACKLESS VALVES! Pressure responsive cup forms positive pressure-tight seal . . . permitting replacement of the diaphragm with full pressure in the valve . . . or even actual operation of the valve *without the diaphragm* . . . in an emergency.

Rugged, pleasing appearance—ease of operation—generous openings—extra long life—all these are standard features of the valve.

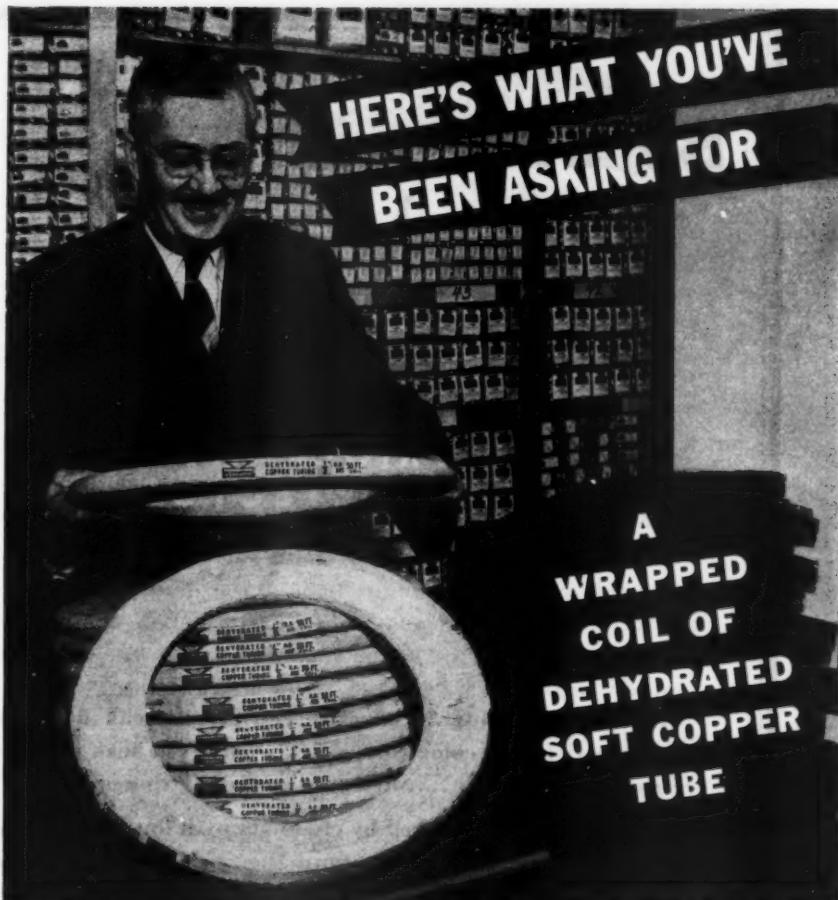
If you haven't a copy of Catalog R3, request one today.

No. 116

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • STOCKS CHICAGO (6) • LOS ANGELES (15) • JOBBERS EVERYWHERE



Mueller Brass Co. Dehydrated Copper Tubing is now conveniently available at your wholesale refrigeration dealers.

Dehydrated Copper Tubing of our manufacture is bright, clean, and as dry as is humanly possible to make it. It is annealed dead soft so that it can be easily formed or bent. It will flare without fracture.

It is furnished in bunched coils carefully wrapped and protected for shipping and stocking. It is manufactured in the following sizes:

1/8" to 3/4" inclusive .035 wall 50' lengths

Order through your jobber.

MUELLER BRASS CO.
PORT HURON, MICHIGAN

JOY TO THE WORLD

Be Sure with . . .



**REFRIGERANT
LEAK DETECTOR**



¶ TRACE is the highly effective refrigerant leak detector with the vivid red color that quickly spots the leak in ANY refrigeration system . . . new, old or reconditioned.

¶ TRACE is manufactured by chemists with long experience in refrigeration, who understand the special and exacting requirements that must be met by any additive to a refrigeration system. The importance of this point cannot be overemphasized.

TRADE PRICES

4 oz. bottle	\$ 1.00
(48 bottles to a case)	
1 pint bottle	\$ 3.00
(24 bottles to a case)	
1 quart container	\$ 5.00
(12 containers to a case)	
1 gallon container	\$16.00
(6 containers to a case)	
Save 10% on case lots	

**For tough-to-spot
Refrigerant Leaks**

HIGHSIDE
195 VERONA AVE.

The Fight against MOISTURE



Old man Noah was a good engineer and made his plans before the deluge came. While the rest of the world had moisture troubles for 40 days and 40 nights, the old skipper and his animal families rode out the storm in the arid ark.

Refrigeration engineers know that TZ will do the job either as a moisture preventive or cure, but the Noahs of the profession meet the problem before it arises. They inoculate new and reconditioned units with TZ.

- A TINY AMOUNT •
- A BIG JOB •
- SMALL COST •

THAWZONE
Fully Protected by U. S. Patents
The PIONEER FLUID DEHYDRANT

**DE CHEMICALS CO.
AVE. NEWARK 4, N. J.**

*The Moving
Dehydrant*

SNAP

...IT'S OPEN

NO "STICKAGE"

SNAP

...IT'S CLOSED

Henry Diaphragm Relief Valve

Instantaneous Pressure Relief with
Fast and Positive Reseating

Design of this relief valve is unique in that it incorporates a diaphragm construction with an unusual seating arrangement. The result is an opening and closing snap-action movement. Large surface area of the pressure actuated diaphragm causes instantaneous relief as compared to gradual opening in conventional spring loaded relief valves. When the pressure in a system reaches the relief point, wire drawing, which may ruin a valve seat, can not take place because there is no slow movement of the valve seat disc in the Henry Diaphragm Relief Valve.

This valve is recommended for protection to a system containing a large charge of freon or methyl chloride refrigerant. It may be employed either for relieving high side or low side to atmosphere. It can also be installed so as to relieve from high to low side of system. It meets the requirements of all existing safety codes. Due to its acknowledged efficiency through dependable performance under all conditions of service, the Henry Diaphragm Relief Valve is today widely used in refrigeration and air conditioning installations of the Army, Navy and Maritime Commission.

The Henry Diaphragm Relief Valve is available in $\frac{1}{2}$ " F.P.T., $\frac{3}{4}$ " F.P.T., $\frac{5}{8}$ " O.D. and $\frac{3}{4}$ " O.D. Solder connections and at pressures ranging from 90 pounds to 300 pounds per square inch. Each valve is individually adjusted, set at pressures ordered and marked with its rated free air passage capacity per minute. Locking device prevents tampering with pressure setting or changes in setting due to vibration.



FOR
FREON
and
**METHYL CHLORIDE
REFRIGERANTS**

Type 542. With solder connec-tions. Extended tube sockets at inlet and outlet ports prevent transfer of installation heat to internal parts.



Type 341. With female pipe thread connec-tions.

Sold by Leading Jobbers



HENRY VALVE CO.

3260 West Grand Avenue • Chicago 51, Illinois
EXPORT DEPARTMENT, 13 EAST 40TH ST., NEW YORK, N. Y.

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR-CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS

Mr. Dealer... Mr. Service Engineer!

...have you ever stopped to think
how You profit by dealing with your
nearest Sporlan Jobber?

1st ... he has the merchandise you need in stock at all times . . . a ready source of supply.

2nd ... he can give you valuable engineering advice . . . he has the manufacturer's scientific data at his finger tips.

3rd . . . he can save you valuable time on many a job because his stock is local.

And, best of all, you know that Sporlan products have always been available through the jobber and always will be . . . not here today, and gone tomorrow.

SPORLAN
manufactures the only
THERMOSTATIC
EXPANSION VALVES
with Selective Charges

SPORLAN
Peak Performance
Liquid Line
Solenoid Valves

SPORLAN
Solenoid Pilot Controls
used in place of
large capacity Liquid
Line Solenoid Valves

SPORLAN
REFRIGERANT DISTRIBUTORS

The Sporlan Refrigerant Distributor is an efficient device for multi-circuit evaporators. It evenly distributes liquid refrigerant to any number of circuits from 2 to 24.

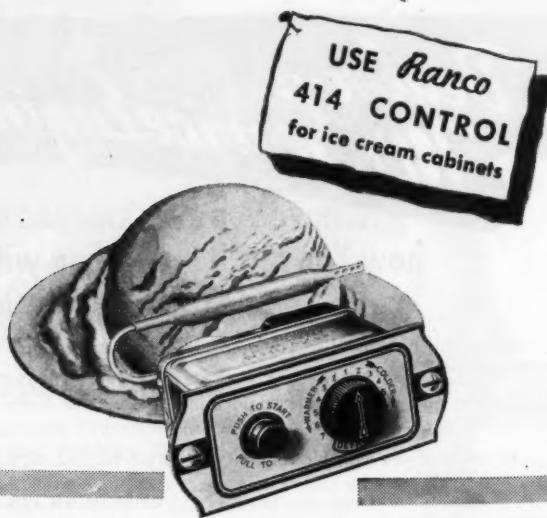


For Peak Performance
on all installations . . .
always specify **SPORLAN**



SPORLAN
MODULATING
PILOT CONTROLS . . . A self actuated temperature control device used in conjunction with Thermostatic Expansion Valves.

SPORLAN VALUE COMPANY
3723 COMMONWEALTH AVE. ST. LOUIS 17, MISSOURI



for dependable protection of ice cream

Win the good will of your ice cream cabinet customers by installing a Ranco 414 Control. It assures constant protection of their ice cream at the right temperature for quick, easy handling.

Sturdily built of finest materials, checked progressively in each step of manufacture by precision inspection, a Ranco Control is a superbly sensitive and accurate instrument capable of long service. Easily adjusted to the desired temperature.

See your Ranco Jobber for the Ranco 414 and other available commercial and domestic controls.

Ranco Inc.
COLUMBUS 1, OHIO

The Refrigeration Service Engineer

Vol. 13

No. 8

August, 1945

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems

Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

The Cover

These double rows of Carrier refrigeration units are being checked to see that the temperature in the storage lockers remains at the correct level to preserve the huge quantities of food in the Navy's "Icebox." Story on page 66.

Published by
Nickerson & Collins Co.
433-435 North Wacker Ave.
Chicago 44
Telephones Austin 1303-1304-1305

EASTERN OFFICE
420 Lexington Ave., New York 17
Telephone Lexington 2-4816

Publishers of Technical Books and Trade Journals Serving the Refrigeration Industries for over 50 years.

Subscription Rates United States \$2.00 per year. Single copies 25c. All other countries \$3.00 per year

Copyright, 1945
by Nickerson & Collins Co., Chicago, 44

CONTENTS

In This Issue.....	21
Refrigeration Service Has Grown Up—by E. A. Seibert	23
Government Bureaus—News and Rulings.....	24
Backlogs Delay Flow of Products to Civilian Uses	24
Authorization of Refrigerator Production Increased	25
No Tin for Current Reconversion.....	25
Motor Limitation Order Revoked.....	25
More Copper Available.....	26
Maximum Prices for Home Freezers and Coolers.....	26
So You Want to Get into Business for Yourself—by Harry D. Busby.....	27
Price Regulation on Used Refrigerators.....	32
Construction, Operation and Servicing Coldspot.....	37
Neighborhood Baker Sells Frozen Dough.....	40
Service Pointers.....	43
Portable Drying Unit.....	43
A Wartime Substitution.....	43
Bellows Seal Repairing.....	44
Stewart-Warner Diagnosis.....	44
Emergency Motor Mounts.....	44
Overcoming High Pressure on Air-Cooled Machines	44
Refrigeration Section New St. Louis Building Code	45
Questions and Answers.....	52
Comments on Question No. 670.....	52
Changing Multiple System from SO ₂ to F-12.....	52
Dehydrating Majestic.....	52
Cooler Calculations.....	52
Grunow Evaporators Will Not Hold Higher Pressures	54
Find the Leak!.....	54
High Pressure Bellows Cracks.....	56
Egg Storage Conditions.....	56
Remodeling Majestic.....	58
Plate Coil Defrosting.....	58
Testing Shell and Tube Condenser.....	58
Defrosting Fin Coils.....	58
Naval Training School Closes.....	60
Model, Model—Who Can Find the Model Number?	66
R.S.E.S. News	72
Illinois State Association Plans Fall Meeting.....	72
Cleveland Chapter Picnic.....	72
Chapter Notes.....	72
Ladies Auxiliary	78
REMA Observes 10th Anniversary.....	78
New and Improved Appliances.....	80
News of the Industry.....	82



tolerance

Microscopic tolerance must be achieved to make a condensing unit operate properly. Mills engineers see that this fine tolerance is obtained in our Air and Water Cooled Condensing Units.

MILLS INDUSTRIES, INCORPORATED • 4100 FULLERTON AVE. • CHICAGO 39, ILL.

IN THIS ISSUE—

A series of "guest editorials" has been in the making for several weeks. The first, by E. A. Seibert, director of Service for Kelvinator Division, Nash-Kelvinator Corp., appears on page 23.

Additional information on opening a service and repair shop is offered in the article on page 27 by Harry D. Busby, associate editor of **REFRIGERATION SERVICE ENGINEER**. This installment gives instructions on repairing compressors and motors, and refinishing cabinets.

An amended regulation of Rev. MPR 139 became effective August 6 bringing maximum prices on household mechanical refrigerators up to date. Detailed provisions of the order, including maximum prices for 1941 and 1942 models "as is" and reconditioned are published in the article starting on page 82.

The final installment of the Coldspot service manual starts on page 87, covering serv-

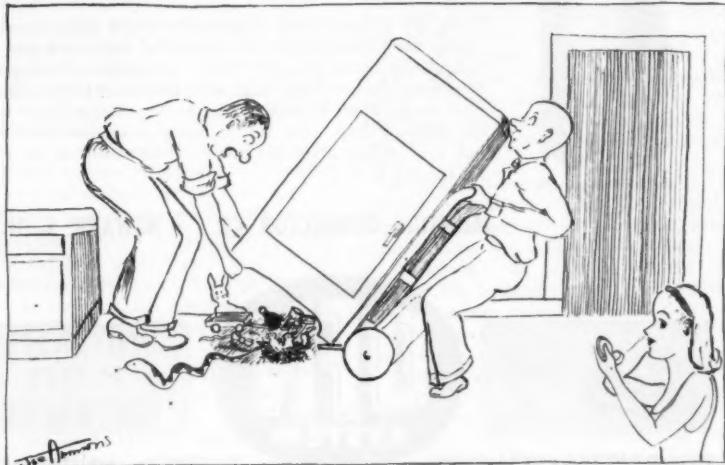
ice operations that follow the trouble charts published in the July issue. Expansion valve settings are given for sixty models or model numbers.

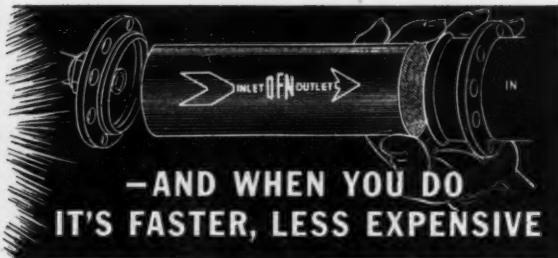
A new venture in frozen foods—processing and selling frozen dough—has been made by a neighborhood baker in Oak Park, Ill. Details of this new business are given in the article starting on page 40.

Methods and devices used by experienced service engineers are in the Service Pointer Section. The pointers serve as a valuable source of information passed on by those who know. Turn to page 48 for the \$5.00 answers to your problems.

An addition to the St. Louis Building Code pertaining to refrigeration systems was approved March 6, 1945. Excerpts of interest to refrigeration, installation and service men are published on page 45.

Oh dear, now you're going to see what kind of a housekeeper I am!





Freeze-ups, clogging and corrosion have three strikes against them when your installations are equipped with the DFN System. You get unmatched triple protection against moisture, sediment and acid—reducing a major cause of shutdowns!

And when the drier is due for a change, you merely open the flange and replace the inexpensive DFN Cartridge. The shell stays on for repeated use. Each cartridge change multiplies your savings in time and parts.

Using the factory-packed, hermetically sealed DFN Cartridge assures the correct quantity and density of dust-free drying and neutralizing agents in each charge. No danger of refrigerant by-passing due to loose packing. Exclusive DFN strainer-filter design filters to minute size, holds more sediment without pressure drop. For full information on how DFN can lick your drying problems, ask your distributor or write us for Catalog R-7.

McINTIRE CONNECTOR CO. NEWARK 5, N. J.





Regularly a national service manager of a well known refrigeration organization will address the readers of *The Refrigeration Service Engineer* on a subject of timely interest.

This Month's GUEST EDITOR

E. A. SEIBERT, *Director of Service*
KELVINATOR DIV. NASH-KELVINATOR CORPN.

Refrigeration Service Has Grown Up

TWENTY years ago household and small commercial refrigeration began to be recognized by the general public as a real necessity. With public recognition came demand, and volume production started.

During the early days of refrigeration practically all product service was handled by the dealer, the distributor, or factory operated service departments. This method was necessary since men had to be taught refrigeration by factory men, for they were the only men who had any practical knowledge of refrigeration.

Within a few years a few hardy souls decided that they could see a good future as independent service men, operating their own business. Gradually more and more men started their own service companies until today a large percentage of the refrigeration service work, in all of the larger cities, is done by service companies. These service companies have become a real factor in refrigeration. They are a recognized part of the distribution system and will become of increasing importance if they recognize their responsibilities.

Many service companies who have contracted with a seller of a product to handle all service, have realized that they had an obligation to protect the good name of the seller and the product, and also realized that the only way they could expect to grow was by conducting their business along lines of fairness to the user, the seller of the product, and themselves. The results have been that these companies have grown very rapidly and have become recognized as good, sound, business men and highly respected in their communities.

This method of handling service is logical and will continue to grow if, and I say IF,

the service companies realize that they must be satisfied with a fair profit; that they must satisfy the user, and also the seller of the product. Handling service this way must be profitable to the dealer. He must be satisfied that his service is not costing him any more than it would if he did the work himself, and he must be satisfied that his customers are receiving as good or better service than he could render.

The old idea "the customer is always right," has paid dividends for many years and must come back into business, as the only source of business dollars is the customer.

In many places service companies have formed associations for the betterment of the business; they are becoming members of local business committees, associations, etc. In fact, they are being recognized as a part of the business world. This indicates that the service companies have grown up; they have proven that they are a respected part of the refrigeration industry.

Those men who had the nerve and foresight to start with nothing but a willingness to work and a kit of tools are to be congratulated. They must have had a lot of the American Pioneer Spirit.

Government Bureaus—News and Rulings

RULINGS and announcements issued by the various Government Bureaus that are of general interest to the refrigeration service industries are summarized below. Only the essential facts are given in most cases, and those who desire further or more complete information on any specific regulation or announcement are advised to write the proper Government agency.

Backlogs Delay Flow of Products to Civilian Users

HEAVY backlog of unfilled orders and continuing military requirements are slowing up the free flow to civilian users of the majority of the products controlled by the General Industrial Division of the War Production Board. With months of unfilled orders on their books and, in some cases, manpower still short, producers are working to bring requirements and supply into balance.

WPB controls over the majority of the industries have been reduced to overall WPB orders and regulations. Only one specific limitation order, L-311, covering certain types of woodworking machinery, remains. The other industries are on their own and are being urged by WPB to make every reasonable effort to find the answer to their own problems except where materials and components are required for military production and where emergency circumstances arise.

To acquaint industry and the public as to the general supply-and-demand situation as it applies to general industrial equipment, the division has prepared the following summaries of the various types of production coming within its field of action.

The delivery situation of integral and fractional horsepower motors, motor generators and control equipment has shown little or no improvement over the last few months, in spite of heavy cancellations, terminations and cutbacks in military programs, WPB said.

Indications are that little improvement can be expected during the third quarter because of heavy and high-rated backlogs of orders on the manufacturers' books, and because of the critical supply situation on such compo-

nents as electrical sheet, cotton insulating tape, gray iron castings, etc. Net new orders during May and June continued to exceed production of general purpose alternating current integral horsepower motors 50 horsepower and smaller, general purpose fractional horsepower motors, and single phase integral horsepower motors.

Some improvement can be expected during the last quarter of this year and the first quarter of next year. Under proposed operating procedures for fourth and subsequent quarters, as covered by Priority Regulations 29 and 30, it is expected that a substantial percentage of current backlog will not be validated and will automatically revert to an unrated basis.

In spite of announced cutbacks in military programs, the requirements of electrical equipment for top military programs are still heavy, with additional requirements for quick delivery confronting the industry daily. Changes in one program are generally being offset by increases in another. An outstanding example is the Navy Spare Parts and Fleet Maintenance Program, which is being put into operation and which offsets to a marked degree reductions in production requirements for new ship construction.

Shipments of commercial and air-conditioning refrigeration machinery continue heavy for the armed forces for the third quarter, particularly in food-handling equipment for the advance bases on the Mid-Pacific. The removal of various limitation and material orders, which have controlled the production and distribution of refrigeration machinery, has released a pentup demand for this type of equipment.

Some concern is felt by certain groups of the refrigeration industry that, as a result of a shortage of components such as fractional horsepower motors, fin and tube condensers and compressor body castings for complete assembly, the present backlog of rated orders will become unmanageable, a hardship will be created and a delay will occur in the reconversion program. The division feels, however, that by the fourth quarter, controlled material and components will have relaxed enough to warrant an initial flow of refrigeration equipment to civilian consumers, even to the extent of unrated orders by the last of this year. It is

expected that, during the transition period, an occasional hardship case will occur in this industry and that, despite the general policy of WPB not to give priority assistance to civilian production, in a very few exceptional cases it will be necessary to help out on the production of certain refrigeration and air conditioning items.

* * *

Authorization of Refrigerator Production Increased

THE production of 1,155,000 mechanical refrigerators by next April was authorized by WPB August 5, but little hope was held out that civilian users would be able to buy one soon.

As announced in the June issue of *REFRIGERATION SERVICE ENGINEER*, materials were set aside for 265,000 refrigerators during the third quarter of this year but no more than 150,000 are expected to be produced.

The WPB limited production to 655,000 units in the combined third and fourth quarters, and 500,000 units in the first three months of 1946, regardless whether they are made with priority assistance for procuring materials.

The refrigerator stockpile, set up with 700,000 units in February, 1942, has dwindled to 20,000 from which the WPB must supply military needs and other essential uses.

When new production is adequate to fill this demand, restrictions on civilian purchases can be relaxed, the WPB said, "but no time can be set for such action as the problem is so immediately related to the progress of the war."

The complete list of manufacturers granted priorities assistance to produce domestic mechanical refrigerators in the third quarter, with the number authorized, follows:

MANUFACTURERS

	PREVIOUSLY ANNOUNCED	FINAL ASSIGNMENT
Admiral Corp., Connersville, Ind., and Tecumseh, Mich.	7,952	8,061
Crosley Refrigerator Co., Richmond Ind.	11,067	11,434
Frigidaire Division, General Motors Corp., Dayton, Ohio	56,445	58,818
General Electric Co., Erie, Pa.	47,501	49,078
Gibson Refrigerator Co., Greenville, Mich.	8,974	9,272
Nash Kelvinator Corp., Grand Rapids and Detroit, Mich.	27,825	28,749
Norge Division, Borg-Warner Corp., Muskegon, Mich.	14,869	14,846
Philco Corp., Connersville, Ind.; Chicago, Ill., and Tecumseh, Mich.	12,090	12,491
Ranney Refrigerator Co., Greenville, Mich.	2,500	2,585
Rohr Aircraft Corp., Chula Vista, Calif.		1,014
Seeger-Sunbeam, Evansville, Ind., and St. Paul, Minn.	25,639	26,490
Servel, Inc., Evansville, Ind.	20,272	20,945
Westinghouse Electric Corp., Mansfield and Springfield, Ohio	21,068	21,767
Totals	255,702	265,000

No Tin for Current Reconversion

A 70 PER cent drop in available supplies of pig tin since January 1, 1942, precludes the possibility of releasing any tin for current reconversion, the War Production Board said July 11 in reporting new data on the serious tin supply situation.

Total pig tin available for allocation and industrial reserve stocks, after allowing for an 18,000 ton minimum industry working inventory and Government stockpiling amounted to only 23,654 tons on May 1, 1945, compared with 88,076 tons on Jan. 1, 1942.

If the automobile, refrigerator, radio, washing machine industries and others were allowed to use tin without restriction, total consumption might easily reach 120,000 tons annually, which would wipe out the stockpile in a short time.

In virtually all cases there are adequate substitute materials for civilian needs, WPB reported. Officials listed among others the following alternatives as possible substitutes: For tin solder, silver lead solder and for tinned refrigerator coils, aluminum refrigerator coils requiring no tinning.

* * *

Motor Limitation Order Revoked

ON JULY 14 WPB revoked Motor Order L-841. Since that time no direct limitations prevent delivery of fractional horse-power motors to those who wish to purchase them. On the other hand, certain purchasers of motors have preference as long as prior Regulation No. 1 is in effect and preference ratings are extended to them by WPB. Certain manufacturers of refrigeration equipment now enjoy preference ratings but it is expected that these will be cancelled before supplies of fractional horse-power motors are sufficient to take care of general demand.

More Copper Available

THE amount of copper wire that repairmen may buy in a calendar quarter without War Production Board authorization has been increased from \$75 worth, or one-tenth of what they used in making repairs in the year 1941 (whichever is greater), to \$150 worth, or one-eighth of 1941 repair usage, WPB announced July 28. This action was taken by amending Controlled Materials Plan Regulation 9A (Parts and Materials for Repairmen).

Specific repairmen for whom the purchases of copper wire has been partially relaxed are refrigeration repairmen, domestic appliance repairmen, electricians, electrical contractors and radio repairmen.

Any repairman who purchases any steel, copper or aluminum under these provisions must keep a separate record of the amount bought in each quarter. It is not sufficient that he merely keep the copies of his purchase orders with copies of his other purchase orders.

The amended regulation also removes the prohibition against use of new cord and other materials obtained under the regulation for certain specified types of maintenance and repair work.

Direction 1 to CMP Regulation 9A has been amended to delete obsolete references, and Direction 2 now provides that a repairman may use up to only \$25 worth of material purchased under the regulation to install any unit of new or used air conditioning or refrigeration equipment. The direction formerly limited material for installation of used air-conditioning or refrigeration equipment only.

MAXIMUM PRICES FOR HOME FREEZERS AND COOLERS

MAXIMUM net prices for home freezers made by certain manufacturers have been established by the Office of Price Administration, as follows:

Stanley Knight Corp., 16 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$280, to dealers \$336, and to consumers \$560.

L. E. Nelson Co., 20 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$270, to dealers \$324, to consumers \$540; 35 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$372, to dealers \$446, to consumers \$744.

Macneil Manufacturing Co., 20 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$380, to dealers \$396, to consumers \$660.

Amana Society, Refrigeration Division, Model No. 200: to distributors \$557.20, to dealers \$696.50, to consumers \$995.

Refrigeration Corp. of America, 6 cu. ft. with $\frac{1}{6}$ hp. condensing unit: to distributors \$180, to dealers \$192, to consumers \$320; 10 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$200, to dealers \$240, to consumers \$400; 14 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$275, to dealers \$316, to consumers \$530; 20 cu. ft. with $\frac{1}{3}$ hp. condensing unit: to distributors \$380, to dealers \$396, to consumers \$660.

The above prices may be increased by \$6.00 (\$4.00 for 6 cu. ft. model of Refrigeration Corp. of America) to cover cost of crating. Actual freight charges may also be added by distributor or dealer.

Maximum prices also have been established on 11 models of milk coolers manufactured by the Victor Products Corp., prices ranging from \$142.30 for $\frac{1}{4}$ hp. compressor to \$295.80 for $\frac{3}{4}$ hp. compressor, distributors, the same models being priced to consumers at \$237 and \$498.

SUSPENSION ORDER ISSUED AGAINST REFRIGERATION CONTRACTOR

CHARGED with violating Priorities Regulation No. 8 and WPB Order P-126, a suspension order has been issued against Morris Gilboard, doing business as Gilboard Refrigeration Co., Lawrence, Mass., engaged in the manufacture, sale and repair of commercial refrigeration units.

The company was charged by the WPB with having purchased new refrigeration equipment amounting to \$13,000 and assembling this equipment with other items and selling the same; and having extended a preference rating in purchasing 18 blowers valued at \$6,000; and with having failed to keep accurate and complete records as required by Priorities Regulation No. 1.

The suspension order provides that the company shall not, for one year from effective date of the order, apply or extend any preference rating or use any CMP allotment symbols to obtain delivery of any refrigerating system equipment or parts on which CMP allotment symbols are used unless authorized in writing by WPB; provided, however, that the company may apply or extend any preference rating for the purpose of obtaining necessary items for the maintenance and repair of compressors, fans or coils for refrigeration equipment actually in operation.

So You Want to Get into Business for Yourself

By Harry D. Busby*

Repairing Compressors

IF YOU are thoroughly equipped to repair or rebuild compressors, you are also equipped to rebuild a greater part of the condensing unit with the exception of the motor. Therefore, we will include the entire condensing unit in this discussion.

Some compressor repairs such as replacing head gaskets, valves or valve plates can be accomplished on the customer's premises. Even seal leaks can often be repaired on the job but most seal repairs and any bearing, wrist pin, piston or ring repairs must be done in the shop where the tools and test equipment to do a thorough job are available.

Seal Repairs

Seal repairs require lapping the seal surfaces. A small sheet of $\frac{1}{4}$ inch plate glass can be used as a lapping surface but a much more satisfactory job requires lapping blocks. These blocks, purchased through most supply jobbers, are supplied in pairs so that one may be kept for rough lapping and the other for finishing. Most lapping operations can be done on special lapping paper placed on top of the lapping block. Steel surfaces can be lapped with 600 grit carborundum paper while bronze or other soft metals require aluminum oxide paper of about the same grit. Using the paper will save the surface of the lapping block.

Replacing main bearings in compressors require line reamers of the expansion type.

* Associate Editor, REFRIGERATION SERVICE ENGINEER.

Replacement bronze bearings are nearly always under size when pressed in place and require reaming. Sizes for the most popular compressors range from 1 inch to 2 inches in steps of $\frac{1}{8}$ inch. A small arbor press for pressing bearings in or out is also advisable but not necessary, since this work can be done in a large bench vise on the smaller compressors and with bearing pullers on the larger compressors.

The repair of bent or scored crankshafts requires too much expensive equipment to be profitable in the average repair shop and are usually replaced. However, if a lathe is to be part of your equipment, the shaft can be straightened between centers of the lathe and with the addition of a grinding attachment, the journals can be reground. This work is not recommended to the repair shop as a successful or profitable part of their work, unless you have other uses for both the lathe and grinding attachment, or where the compressor is an orphan and parts are not available.

ARTICLE VIII.—EQUIPMENT

In this eighth article of the series, shop equipment for reconditioning the mechanical parts of the refrigerating unit is discussed. Many valuable pointers are also included on how the shop tools and equipment are used to advantage. This installment presents suggestions for cleaning the parts before overhauling, and painting when the repairs are completed.

Connecting rods may be repaired or replaced. Wrist pins and bushings are the most frequent point of trouble, both of which are replaceable. A set of expansion reamers ranging in size from $\frac{3}{8}$ inch to $\frac{3}{4}$ inch are all that is needed. Replacement bearing shells for connecting rods are obtainable and hand bearing scrapers are the only tools needed in fitting to the shaft. Eccentric rods are usually not repairable, except for the wrist pin bushings.

The reamers and lapping blocks previously mentioned are again used for reaming the wrist pin holes in pistons where oversize

wrist pins are being employed and lapping suction and discharge valve seats. Piston rings are replaceable in the oversize required and usually need no fitting. It is seldom that any repair is required on the cylinders and it is not recommended that any attempt be made to refinish cylinders in the repair shop. Honing equipment for this work can be purchased but the average repair shop does not have sufficient work of this nature to make purchasing of the equipment profitable. Some cylinder blocks have replaceable sleeves while others can be returned to the factory for repair.



Lapping a seal by direct contact with the lapping block.

Some discharge valve seats are replaceable—others may require resurfacing which is done by working them down to a flat surface, either with lapping compound or emery cloth backed up by a flat surface. The valve seats in some compressors are at the same level as the face of the valve plate and resurfacing can be done on the lapping blocks. Some valve seats are below the plate surface and it is necessary to make lapping tools of various diameters which will reach into the recessed valve seat. A small high speed drill press is a convenient machine tool for this work although it can be done much more slowly with a breast drill.

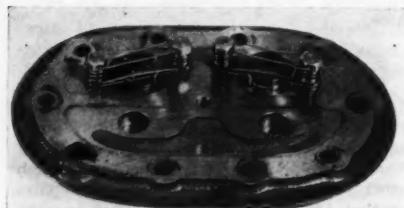
Broken bolts and stripped threads are often encountered in compressors and the

shop should have a set of both U. S. standard and S.A.E. taps from $\frac{1}{4}$ inch to $\frac{5}{8}$ inch inclusive, together with drills and tap wrenches. A set of pipe taps from $\frac{1}{8}$ inch to 1 inch will also be required occasionally. Here again a small drill press will be very useful in drilling out broken studs or to redrill and tap stripped threads to the next larger size.



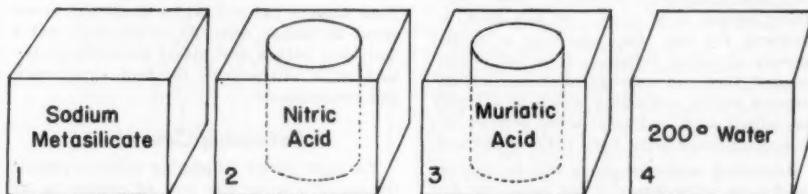
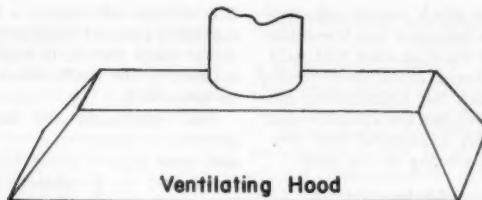
A handy small lathe with cabinets for tools.

Many compressors will be found to contain gummy sludges and carbon which must be removed during repair. All compressors should be thoroughly cleaned and repainted before returning to the customer. The clean repainted exterior will impress your customer more than all the other work done on the compressor and which he cannot see.



Valve seats can be lapped on lapping blocks if the seats are flush with the plate.

Gasoline or carbon tetrachloride will remove the greasy substances but will not remove the gummy sludges. Your fire insurance company will not approve the use of gasoline. Carbon tetrachloride is expensive for such cleaning jobs, unless you set up reclaiming equipment which is also expensive. Therefore, cleaning and pickling tanks are



Diagrammatic sketch of the cleaning process showing solutions and acids used.

suggested as the most efficient and economical means of cleaning all parts and assemblies. These tanks or large size stone jars are set up in groups—one containing a degreasing solution such as Oakite, one or two

cially the low temperature work which is becoming more and more common which must be very carefully dried. A drying oven and a vacuum pump can be constructed in your shop at a very low cost from materials obtainable locally. A refrigeration compressor and motor will serve very well as a vacuum pump providing it is in good enough condition to pull a 26 to 28 inch vacuum. For construction details on an oven see the April, 1947 issue of **THE REFRIGERATION SERVICE ENGINEER**.

A run-in test after rebuilding requires a run-in stand. These stands cannot be purchased and, therefore, must be built from materials at hand. A refrigeration motor mounted on an adjustable base which can be adjusted to all makes of compressors, a small pressure tank of about one cubic foot capacity, a compound gauge and a high pressure gauge will permit testing the compressor under operating pressures, while it is being run-in. It is advisable to mount the run-in stand inside a shallow metal pan to catch the oil which would otherwise spread over the floor or bench that the unit is mounted on.

Condensers and receivers may be cleaned externally and internally with the same cleaning and pickling solutions used on other parts with the aid of funnels or other means of circulating the solutions through them. Leaks which can be repaired with soft solder or silver solder will require some type of

containing acids and another rinsing water. Complete instructions on the construction arrangement and the solutions to use is found in the June, 1941 issue of **THE REFRIGERATION SERVICE ENGINEER**.

Final Cleaning of Compressor

After repairing and assembling the compressor, it must be thoroughly dried. A final flushing with carbon tetrachloride will remove most of the moisture but not all of it and there will be some repair jobs, espe-

torch. Blow torches which can be adjusted to a fine flame are satisfactory but Prestolite torches and tanks of the type used with field service kits will be found much more versatile. For strictly shop use, illuminating gas and compressed air torches are available and are perhaps the most economical and convenient method of soldering in the shop.

Repairing Motors

For the service company located some distance away from motor repair services, the tools and equipment needed to make minor motor repairs is a "must." It is a good investment for any shop receiving a normal amount of motor repairs. It is not recommended that the average service company attempt motor rewinding which is a highly specialized work but most other repairs can be accomplished with very little equipment.

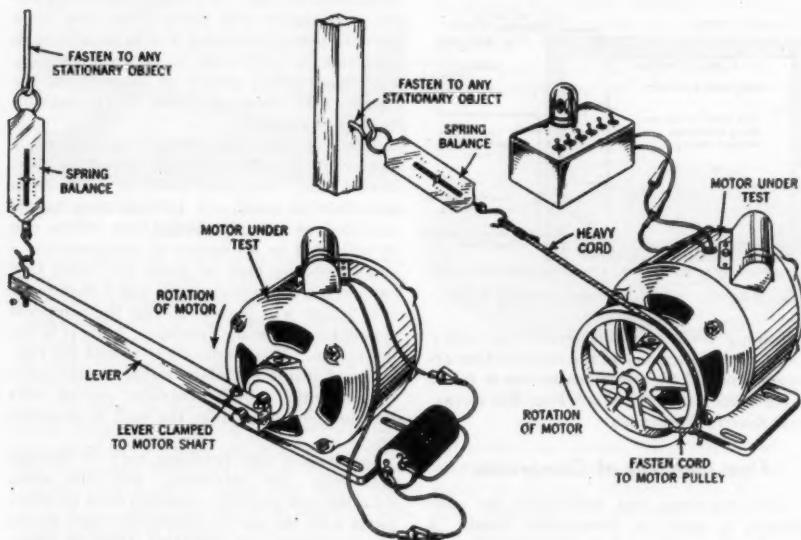
Replacing motor bearings will be another use for an arbor press if you have one, but the bench vise or bearing pullers will do the work. Line reamers will be needed to ream the bearings and since the most popular sizes range to as small as $\frac{9}{16}$ inch, it will be necessary to add the sizes from $\frac{9}{16}$ inch to 1 inch to those previously mentioned as needed on compressors. Cutting the commutators on

R.I. motors will require a lathe. This is an expensive piece of equipment for the average repair shop but it is highly recommended because of the multitude of jobs which can be done on it.

Test equipment for motors includes a growler, an ammeter, a volt meter, test cords and some type of prony brake. All of these items may be purchased or you can build your own prony brake testing equipment. The ammeter, volt meter, test light and power outlets should be mounted on a test panel for convenience and to protect them from damage in handling. A small test bench about 80 inches wide, 38 inches high and 4 feet long with a test panel mounted at the back of it will provide the best appearance and convenience.

Refinishing Cabinets

The best job of refinishing cabinets entails the use of a spray gun and, of course, an air supply for the gun. It is advisable to purchase a well known make of gun in order to avoid trouble in its use and the resultant poor jobs. A low pressure gun will be best for the service shop. The air supply can be secured with an old refrigerating compressor and motor connected to a fairly large pres-



Locked Rotor Motor Test. Pony brake test requires the adjustable end of the lever to be large enough to slide over a flat pulley for brake action.

sure storage tank. A pressure regulating valve between the gun and tank, a pressure cut-off control and a safety relief valve will complete the equipment. Some means must be provided for exhausting the paint and fumes from the room. A small spray booth

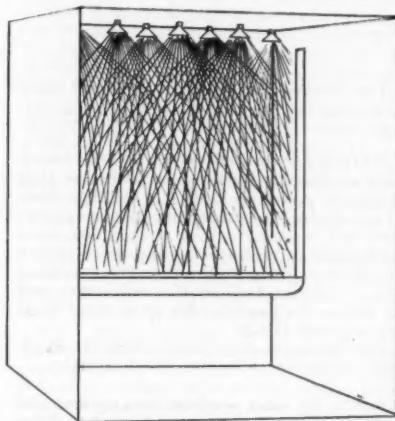


Diagram of spray booth using water curtain for absorbing paint.

or spray room with an exhaust to the outside is the usual setup in service shops. The latest method is to spray into a curtain of water which catches all the paint, carrying it to a flotation tank where it can be skimmed off occasionally. The curtain is obtained by the use of a row of flat spray nozzles fed by a recirculating water pump. This equipment appears at first thought to be too expensive for the average service company but it will often prove less expensive and much more convenient and cleaner than an exhaust to the outdoors.

Other desirable pieces of equipment for the shop are a refrigerant drum rack and a refrigerant transfer unit. The rack can be constructed of wood or steel and may take any form you desire to hold two or three large drums of refrigerant in position for changing small service drums. The refrigerant transfer unit may be purchased through your jobber or constructed from standard fittings and valves much like a heat exchanger.

Nothing has been said here about such items as wrenches, and other hand tools. It is assumed that the men doing the shop work in most cases will also be handling field calls. The field service kit, therefore, will provide all the hand tools necessary.

SELL ROOM COOLERS ON TRIAL BASIS

MERCHANDISING of semi-portable room air conditioners, on the familiar "try before you buy" plan utilized by dealers in many smaller appliances, will be tried in the postwar period, H. F. Hildreth, manager of the Refrigeration Specialties Department, Electric Appliance Division of the Westinghouse Electric Corporation announced recently.

"The moment wartime restrictions relax to the point of permitting us to start the manufacture of Mobilaire room air conditioners, our dealers expect to start putting them into commercial establishments and homes for a small installation fee," Mr. Hildreth continued. "If the prospect decides to buy the unit, the installation fee is applied to the cost. If he should decide that he doesn't want the unit after all, the installation fee will help defray the cost of the trial installation."

"It has been estimated that the demand for room air conditioners will be at least 100,000 units during the first year that unrestricted manufacture is permitted," Mr. Hildreth said, adding, "this figure takes in both new installations and the replacement of worn out or obsolete equipment."

A survey conducted by Westinghouse has shown that, of the 1941 Mobilaires sold by the company, 45 per cent went into private homes and apartment houses, indicating that the residential market offers the greatest single sale for room air conditioners. Twenty per cent were purchased by the commercial market: small shops, private offices, banks, schools and hospitals, while another 15 per cent went into professional offices. The remaining 20 per cent were sold to the industrial market for use in private offices and small laboratories.

"In checking these markets we find that all are within easy reach of the appliance dealer's place of business," Mr. Hildreth continued, "and so the Mobilaire will be sold through our normal distributor-dealer channels in the postwar era. The unit will also be sold through department stores and specialty dealers."

The importance of intensive promotion was stressed by Mr. Hildreth, who said, "the room air conditioner has not yet reached the 'over-the-counter' sales stage, but still requires intensive promotion and selling in which display and demonstration, as well as newspaper advertising during the hot weather months, play an important part."

Price Regulation on Used Refrigerators

Amended—Later Models Added

IN AN amended regulation (Rev. MPR 139) effective August 6, OPA brought the maximum prices on used household mechanical refrigerators up to date and added a number of provisions to make it more workable.

Refrigerators sold "as is" must have all parts necessary for operation. This point was not expressly made in the previous regulation, the agency said.

A consumer selling a used mechanical refrigerator to another consumer may meet the guarantee requirements of the regulation by giving a written agreement to pay for all parts and repairs needed to fulfill the warranty, if he cannot himself provide such parts and repairs, OPA said. The warranty provision was written with dealer-to-consumer sales in mind and required the seller to provide parts and repairs, OPA said. Without some alternative provision, consumers were usually unable to sell on a warranted basis, the agency explained.

All models produced in 1941 and 1942, and all chest-type or lift top refrigerators, heretofore priced under a formula in the regulation, are given dollar-and-cent prices. The specific ceiling prices are the same as prices that would be arrived at by applying the formula, OPA said, but specific prices are preferable, because they relieve the seller of the burden of calculating price ceilings.

The \$5 warranty allowance added by the seller on sales of used refrigerators with a one-year guarantee is increased to \$10 on 1939 and 1940 models, since these models no longer are covered by the manufacturer's original five-year guarantee, OPA said.

Control of refrigerator rentals by landlords to tenants in connection with the use or occupancy of housing accommodations was clarified. Such rentals are covered by the rent regulations, not by the price regulation, OPA said.

The wording is amended to make it clear that used refrigerators sold in the Territory of Hawaii are not covered by the used refrigerator regulation but by the regulation governing sales of most commodities in Hawaii.

The detailed provisions on these and other points are set forth in the regulation as follows:

SECTION 1. Sales and rentals of used household mechanical refrigerators at higher than maximum prices prohibited. (a) Regardless of any contract or other obligation, no person shall sell, rent, or deliver a used household mechanical refrigerator to any other person at prices or rates higher than the maximum prices or rates fixed by this regulation, and no person shall agree, offer or attempt to do any of these things.

(b) Prices or rates lower than the maximum prices or rates may be charged.

SEC. 2. To what products, transactions and persons this regulation applies—(a) What products are covered by the regulation. This regulation covers sales and rentals of all household mechanical refrigerators which have ever been used, or which have been in the possession of a consumer for more than five days or were manufactured for use in the year 1940 or earlier.

(b) What transactions are covered by this regulation. This regulation covers all sales and rentals of used household mechanical refrigerators by any person to any other person, including sales by an individual who is selling his own refrigerator, and sales by dealers or auctioneers, except (1) sales by a foreign seller to any domestic buyer (this exception includes domestic buyers who purchase through a bona fide agent); and (2) rentals by a landlord who supplies or rents the refrigerator in connection with the use or occupancy of housing accommodations.

(c) What persons are covered by this regulation. This regulation applies to any person who sells or rents a used household mechanical refrigerator except (1) foreign sellers and domestic buyers insofar as they purchase from the foreign sellers, and (2) landlords who supply or rent the refrigerators in connection with use or occupancy of housing accommodations, and tenants of such housing accommodations. The term "person" includes: An individual, corporation or any other organized group; their legal successors or representatives; the United States, or any government, or any of its political subdivisions; or any agency of the foregoing.

SEC. 3. Maximum prices for sales of used household mechanical refrigerators by all persons—(a) Reconditioned refrigerators. As used in the table below a refrigerator is reconditioned if it meets the following standards:

(1) The refrigerator is capable of continuously maintaining, with normal cycling, an average interior cabinet temperature in the food storage space not exceeding 50° F., under no-load conditions, when placed in a room in which the temperature is 90° F.

(2) All cooling units, compressors, condensers, motors and controls, where such parts are exposed to the accumulation of dust, as well as all shelves, hardware and machine compartments, are thoroughly cleaned, and function properly. Belts on open-type units must be free from frays and splits.

(3) A defrosting tray large enough to catch all drip from the cooling unit, and a minimum of two corrosion-resistant ice cube trays with grids are provided.

(4) Cabinet exteriors, finished with either synthetic enamel or lacquer have all metal completely covered and free from chips, stains, scratches, blisters and other blemishes. Any such defects have been buffed, smoothed, filled, and either spot sprayed, or the entire exterior resprayed, where one of these methods is necessary in order to obtain a finish similar to the original finish. Cabinet exteriors and interiors finished with porcelain are thoroughly cleaned, rust removed from any chips and patched with a suitable cement.

(b) **"As is" refrigerators.** An "as is" refrigerator is one which does not meet the standards of a reconditioned refrigerator but

has all the parts essential for its operation as a refrigerator.

(c) **Guarantees.** Every refrigerator which is sold as a reconditioned refrigerator must carry a written guaranty for at least 90 days from the date of its installation which provides that any part which proves defective within the guaranty period will be replaced without charge for labor or materials or other services. If the guaranty is to last for one year or more the higher reconditioned price appearing in the table of prices may be charged. In the case of consumer-to-consumer sales this requirement may be satisfied by the seller's giving a written agreement to pay for all parts and repairs needed to fulfill the guaranty.

The maximum prices of 1940 and earlier models were published in the June and July 1942 issues of THE REFRIGERATION SERVICE ENGINEER. The present amendment continues the same maximum prices for "as is" refrigerators which are defined above in paragraph (b) of Section 3. The "unreconditioned" classification (Column B in previous list) has been discontinued.

Prices for "reconditioned" refrigerators are the same as given in former list under column C, but the definition given before in Section 3 should be noted along with the "Guarantees" in paragraph (c). The maximum prices for the 1941 and 1942 models are given in the following tables.

NOTE: If one year guarantee is furnished, \$5.00 may be added to the prices in the second column for models of 1941 and 1942, and \$10 for earlier models.

Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty
COLDSPOT				CROSLEY				FRIGIDAIRE—Continued			
1941	41124	\$ 77.00	\$ 80.50	1941	A-641	\$ 84.00	\$ 87.50	LS-6-41	89.50	93.00	
	41126	80.50	84.00		SS-641	89.50	93.00	L-6-41	98.50	102.00	
	41326	112.00	115.50		S-641	96.50	100.00	LP-6-41	112.50	116.00	
	41426	119.00	122.50		SE-641	107.00	110.50	L-8-41	117.50	121.00	
	41428	133.00	136.50		DM-641	131.00	134.50	M-6-41	109.00	112.50	
	41338	136.50	140.00		SE-841	131.00	134.50	MP-6-41	123.00	126.50	
1942	41216	97.50	101.00		DM-841	159.00	162.50	C-6-41	126.50	130.00	
	42236	112.50	116.00	1942	A-642	107.50	111.00	CP-6-41	145.50	149.00	
	41336	127.50	131.00		SS-742	115.00	118.50	C-9-41	147.50	151.00	
	41228	120.00	123.50		S-742	122.50	126.00	CD-6-41	152.50	156.00	
	41238	135.00	138.50		SE-742	141.00	144.50	CPD-6-41	166.50	170.00	
					DM-742	167.50	171.00	CPD-9-41	187.50	191.00	
					SE-942	167.50	171.00	CPD-13	204.50	208.00	
					DM-942	200.50	204.00	1942	AH-4	92.00	95.50
									AH-6	94.50	98.00
									S-7-42	98.50	102.00
									M-7-42	108.00	111.50
									MP-7-42	123.50	127.00
									D-7-42	119.50	123.00
									DP-7-42	135.00	138.50
									D-9-42	150.00	153.50
									DP-9-42	165.50	169.00
									CD-7-42	167.00	170.50
									CPD-7-42	182.00	185.50
									CD-9-42	189.50	193.00
									CPD-9-42	205.00	208.50
									CPD-13	322.00	325.50

Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	
GENERAL ELECTRIC												
1941	B-3	\$ 91.50	\$ 95.00	1941	A-3-41	\$ 73.50	\$ 77.00	1941	M-942	150.00	153.50	
	LB-3	86.50	90.00		AXF-3-41	79.00	82.50		S-642	128.00	131.50	
	LB-4	86.50	90.00		A-4-41	84.00	87.50		S-942	180.00	183.50	
	BY-4	100.50	104.00		B-6-41	77.00	80.50		S-742	169.00	172.50	
	LB-6-41	91.50	95.00		SS-6-A	91.00	94.50		S-742-P	184.00	187.50	
	LBX-6-41	96.50	100.00		DA-6-41	98.00	101.50					
	JB-6-41 B	107.00	110.50		S-6-41	105.00	108.50					
	PJB-6-41	121.00	124.50		R-6-41	123.50	127.00					
	B-6-41	143.50	147.00		PS-6-41	119.00	122.50					
	PB-6-41	161.50	165.00		M-6-41	133.00	136.50					
	BH-7-41	134.50	138.00		S-8-41	133.00	136.50					
	B-7-41	152.00	155.50		M-8-41	161.00	164.50					
	PB-7-41	166.50	170.00		1942	A-4-42	105.00	108.50				
	JB-8-41	128.00	131.50		B-6-42	97.50	101.00					
	B-8-41	166.00	169.50		SS-7-42	112.50	116.00					
	PB-8-41	180.00	183.50		DA-7-42	120.50	124.00					
	PB-12-B	308.00	311.50		S-7-42	131.50	135.00					
	PB-16-B	350.00	353.50		R-7-42	142.50	146.00					
1942	LB-4-42	95.50	99.00		M-7-42	165.00	169.00					
	LB-6-42	95.00	98.50		S-9-42	165.50	169.00					
	LB-7-42	114.50	118.00		M-9-42	195.00	198.50					
	LBX-7-42	125.50	129.00									
	JB-7-42	137.00	140.50									
	PJB-7-42	152.00	155.50									
	B-7-42	167.50	171.00									
	B-8-42	182.50	186.00									
	PB-8-42	197.50	201.00									
	PB-12-42	338.00	341.50									
	PB-16-42	384.00	387.50									
GIBSON												
1941	A-331	\$ 77.00	\$ 80.50	1941	LE-6-41	\$ 77.00	\$ 80.50	1941	M-300	\$103.50	\$107.00	
	A-471	91.00	94.50		LSS-6-A	91.00	94.50		M-400	109.00	112.50	
	C-631	68.50	72.00		LDA-6-41	98.00	101.50		M-500-A	125.50	129.00	
	CU-631	84.00	87.50		LS-6-41	105.00	108.50		M-500-B	107.50	111.00	
	CUB-631	98.00	101.50		LR-6-41	115.50	119.00		M-500	148.00	151.50	
	F-671	98.00	101.50		LPS-6-41	119.00	122.50		M-600-A	138.00	141.50	
	F-6721	105.00	108.50		LNH-6-41	133.00	136.50		M-650-A	132.50	136.00	
	F-681	155.50	159.00		LS-8-41	133.00	136.50		M-600	170.00	173.50	
	SF-691	147.00	150.50		LNH-8-41	161.00	164.50		M-800-A	165.00	168.50	
	SE-791	161.00	164.50		1942	LB-6-42	97.50	101.00		M-800	200.00	203.50
1942	CU-623	(stripped)	105.00	108.50		LSS-7-42	112.50	116.00		M-1100	234.50	288.00
	(CU-632)				LDA-7-42	120.50	124.00		N-400	111.00	114.50	
	(extras)				LS-7-42	131.50	135.00		N-500-A	127.00	130.50	
	F-662	131.50	135.00		LR-7-42	142.50	146.00		N-500-B	132.50	136.00	
	F-682	150.50	154.00		LNH-7-42	165.50	169.00		N-600-A	141.50	145.00	
	F-782	165.50	169.00		LS-9-42	165.50	169.00		N-600-B	178.00	181.50	
	SF-792	195.00	198.50		LNH-9-42	195.00	198.50		N-600	209.50	213.00	
HOT POINT												
1941	EA-3	\$ 86.50	\$ 90.00	1941	651	\$ 77.00	\$ 80.50	1941	N-800-A	203.50	207.00	
	EA-4	86.50	90.00		661	87.50	91.00		N-800	246.50	250.00	
	EA-6	88.00	89.50		671	94.50	98.00		N-1100	350.50	354.00	
	EAS-6	96.50	100.00		691	105.00	108.50					
	EB-3	91.50	95.00		781	119.00	122.50					
	EB-6	107.00	110.50		881	119.00	122.50					
	EB-7	134.50	138.00		981	129.50	133.00					
	EB-8	127.50	131.00		1942	642 Std.	94.00	97.50				
	EBP-6	121.00	124.50		671-B-Del.							
	EC-6	121.00	124.50		Sp.	99.50	103.00	1941	601	\$ 84.00	\$ 87.50	
	EC-7	152.00	155.50		622-Std.	105.00	108.50		611	98.00	101.50	
	EC-8	166.00	169.50		672-Delux.	112.50	116.00		801	119.00	122.50	
	ED-6	134.50	138.00		692-Delux.	124.00	127.50		661	139.50	143.00	
	ED-7	166.00	169.50		882-Delux.	139.00	142.50		671	160.50	164.00	
	ED-8	180.00	183.50		782-Su-				861	167.50	171.00	
	ED-12	308.00	311.50		preme	135.50	139.00	1942	662	188.50	192.00	
	ED-16	350.00	353.50		982-Su-				612	124.50	128.00	
1942	EA-63-42	95.00	98.50		preme	150.50	154.00		802	145.00	148.50	
	EA-7-42	114.50	118.00		1941	D-621	91.00	\$ 94.50		662	180.00	183.50
	EAS-7-42	125.50	129.00		D-622	98.00	101.50		672	194.00	197.50	
	EB-7-42	137.00	140.50		D-901	126.00	129.50		862	205.50	209.00	
	EBP-7-42	152.00	155.50		M-623	105.00	108.50		872	218.50	222.00	
	EC-7-42	167.00	170.50		M-661	122.50	126.00					
	EC-8-42	182.00	185.50		M-662	133.00	136.50					
	ED-8-42	197.50	201.00		M-902	143.50	147.00					
	ED-12-42	338.00	341.50		S-663	143.50	147.00					
	ED-16-42	384.50	388.00		S-903	164.50	168.00					
					M-624-P	119.00	122.50					
					M-664-P	136.50	140.00					
					S-664-P	157.50	161.00					
					S-884-P	189.00	192.50					
					M-642	113.00	116.50					
					M-742	150.00	153.50					
KELVINATOR												
1941	A-3-41	\$ 73.50	\$ 77.00	1941	M-942	150.00	153.50	1941	U-3-41	\$ 80.50	\$ 84.00	
	AXF-3-41	79.00	82.50		S-642	128.00	131.50		AS-4-41	84.50	88.00	
	A-4-41	84.00	87.50		S-942	180.00	183.50		S-641	86.00	89.50	
	B-6-41	77.00	80.50		S-742	169.00	172.50		S-641	98.00	101.50	
	SS-6-A	91.00	94.50		S-742-P	184.00	187.50		B-6-41	107.00	110.50	
	DA-6-41	98.00	101.50						BP-6-41	121.00	124.50	
	S-8-41	133.00	136.50						D-7-41	128.00	131.50	
	M-8-41	161.00	164.50						B-9-41	127.50	131.00	
	1942								M-7-41	145.50	149.00	
									DP-7-41	152.50	156.00	
									M-9-41	166.00	169.50	
									MP-9-41	186.50	190.00	
NORGÉ—Continued												
1941	M-942	150.00	153.50	1941	PHILCO							
	S-642	128.00	131.50									
	S-942	180.00	183.50									
	S-742	169.00	172.50									
	S-742-P	184.00	187.50									
PHILCO												
1941	MU-6	\$ 86.00	\$ 89.50	1941	SERVEL-ELECTROLUX							
	MR-6	93.00	96.50									
	MS-6	103.50	107.00									
	M-6	114.00	117.50									
	MH-6	121.00	124.50									
	MA-7	138.50	142.00									
	SS-7-42	112.50	116.00									
	DA-7-42	120.50	124.00									
	S-8-41	133.00	136.50									
	M-8-41	161.00	164.50									
	1942											
SERVEL-ELECTROLUX												
1941	M-300	\$103.50	\$107.00	1941	WESTINGHOUSE							
	M-400	109.00	112.50									
	M-500-A	125.50	129.00									
	M-500-B	107.50	111.00									
	M-500	148.00	151.50									
	M-600-A	138.00	141.50									
	M-650-A	132.50	136.00									
	M-600	170.00	173.50									
	M-800-A	165.00	168.50									
	M-800	200.00	203.50									
	M-1100	234.50	288.00									
	N-400	111.00	114.50									
	N-500-A	127.00	130.50				</					

Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty	Year	Model	Price "as is"	Price Re- conditioned with 90-day guaranty
Westinghouse—Continued											
1942	A-4-42	98.50	102.00	Bohn	10.50	48.00	Merchant and	10.50	48.00		
	A-6-42	105.00	108.50	Briggs	15.00	52.50	Evans	12.00	49.50		
	E-7-42	111.00	114.50	Buckeye	10.50	48.00	Mohawk	9.00	46.50		
	AS-7-42	122.50	126.00	Cavalier	10.50	48.00	Rice				
	B-7-42	133.50	137.00	Chirlite	10.50	48.00	Servel-Electric	10.50	48.00		
	D-7-42	152.50	156.00	Commerce	10.50	48.00	(Open)				
	B-9-42	152.50	156.00	Graybar-Ilg-Kold	10.50	48.00	Servel-Electric	9.00	46.50		
	D-9-42	185.50	189.00	Grinnell	10.50	48.00	(Hermetic)	12.00	49.50		
MISCELLANEOUS MAKES											
Atwater Kent		\$10.50	\$48.00	Gruenow	12.00	49.50	Starr Freeze	12.00	49.50		
Belleville		10.50	48.00	King Kold	9.00	46.50	Trukold	9.00	46.50		
				Lectric-Ice and			U.S. Hermetic	9.00	46.50		
				Challenger	10.50	48.00	Weisbach	10.50	48.00		
				Liberty	10.50	48.00	White Mountain	9.00	46.50		
				Majestic (Sealed)	9.00	46.50	Wurlitzer	12.00	49.50		
				Majestic (Open)	10.50	48.00	Zerozone	12.00	49.50		

(e) **Maximum prices for chest type or lift-top model refrigerators.** The maximum price for any chest type or lift-top model refrigerator shall be \$9.00 if it is sold "as is" and \$46.50 if it is sold as "reconditioned." For purposes of this section a chest type or lift-top household mechanical refrigerator is one having a net food storage capacity of less than three cubic feet and having the door giving access to its food storage compartment opening upwards from the top.

(f) **Maximum prices for models for which maximum prices are not fixed in the preceding paragraphs.** If the maximum price for any used household mechanical refrigerator is not specified in the preceding paragraphs, the maximum cash price shall be determined by the maximum price of the refrigerator listed in the foregoing table which corresponds most closely to the refrigerator being priced, with regard to age, finish, capacity, type of model and mechanical and cabinet equipment. The maximum price selected from the table shall correspond to the conditions under which the refrigerator is to be sold, i.e., "as is", or reconditioned with a 90-day or a one-year guaranty.

(g) **Maximum prices for refrigerators with new or factory rebuilt units.** (1) This paragraph shall apply only in cases in which:

(i) The refrigerator meets the standards of a reconditioned refrigerator and is sold with a one-year guaranty.

(ii) The refrigerator contains a new unit or one rebuilt by the original manufacturer, or by a reconditioner who offered such a service in February, 1942, or earlier, and furnished with it at least a one-year guaranty.

(iii) The new or rebuilt unit has been purchased by the person offering the refrigerator for sale.

(2) The maximum cash price for a refrigerator with a new or rebuilt unit meeting the qualifications of the foregoing section shall be the sum of:

(1) The "as is" maximum price for that refrigerator, and

(ii) The manufacturer's net suggested resale maximum price in effect in March, 1942, or subsequently specifically approved by the Office of Price Administration, for the replacement unit contained in the refrigerator, or if no manufacturer's suggested resale price was in existence in March 1942, or later subsequently approved by the Office of Price Administration, the net cost to the dealer for the replacement unit, plus the dollar markup taken for the sale of the most comparable item in March 1942.

(h) **Sales in Western states.** If the sale of the refrigerator is made to a person in the States of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, or Wyoming, \$5.00 may be added to the maximum price.

(i) **Taxes.** Any tax upon or incident to the sale of a used household mechanical refrigerator may be added to the maximum prices established by this Regulation. Thus if the seller has paid a Federal excise tax upon the rebuilding of the refrigerator, that tax may be added.

(j) **Sales for export.** The maximum price at which a person may export any used household mechanical refrigerator is established by the provisions of the Maximum Export Price Regulations.

(k) **Credit, delivery and other charges.** Any charge which is not quoted and billed separately shall for the purposes of this Regulation be considered to be part of the selling price of the refrigerator. Charges for the extension of credit or for delivery, packing or installation, may be added to the maximum retail price set forth in this section, provided: (1) the seller during the two-month period ending February 16, 1942, made a separate charge for the extension of credit, delivery, packing or installation services the amount of which was separately stated to the purchaser, (2) the amount charged for the extension of credit or for delivery, installation or packing, is not in excess of the charge in effect during the two-

month period ending February 16, 1942 upon sales of used household mechanical refrigerators, and (3) such charges are quoted and billed separately. No seller may require as a condition of sale that the purchaser accept any of the services mentioned.

Sec. 4. Maximum rental rates. (a) The maximum rate which may be charged for the rental of a refrigerator shall be determined in accordance with the maximum sale price as set forth in the table below:

MAXIMUM SALE PRICE, RECONDITIONED
WITH A 90-DAY GUARANTY

From	But below	Maximum monthly rental rate
\$46.50	\$55.00	\$2.50
55.00	65.00	3.00
65.00	75.00	3.50
75.00	85.00	4.00
85.00	95.00	4.50
95.00	105.00	5.00
105.00	115.00	5.50
115.00	125.00	6.00

Refrigerators whose maximum sale price (reconditioned with a 90-day guaranty) is \$125.00 or more may be rented at a maximum monthly rate not to exceed 5 percent of the maximum sale price, calculated to the nearest half dollar.

(b) *Delivery of rental refrigerators.* An additional amount may be added to the rental rate to cover delivery and pick-up of rented refrigerators where such service is rendered, which may not exceed \$5.50.

(c) *Maintenance of rented refrigerators.* A rented refrigerator must meet the standard set forth for reconditioned refrigerators in Sec. 3 (a) and during the period of the rental must carry the guaranty provided for in Sec. 3 (c).

(d) *Rental payments in advance.* A person who supplies a rented refrigerator may not ask for or receive rental payments for more than three months in advance.

(e) *Seasonal rentals.* Persons who rented refrigerators prior to April 1, 1942 for a period less than four months for use during that period in a resort community in households occupied by vacationers, shall compute their maximum prices in the manner provided by section 6 of Revised Maximum Price Regulation No. 165. The ceiling price for rentals on a seasonal basis by persons who did not rent refrigerators on a seasonal basis prior to April 1, 1942, is the price in line with level seasonal rental prices, fixed by the Office of Price Administration after application to it for the fixing of such a price. No such persons may rent refrigerators on a seasonal basis until such an order has been issued.

tors on a seasonal basis until such an order has been issued.

Sec. 5. Prohibited practices. (a) Any practice which is devised to get the effect of a higher than ceiling price without actually raising the dollar and cent's price, is as much a violation of this regulation as an outright over-ceiling price. This applies to devices making use of commissions, services, transportation arrangements, tying agreements tying requirements, trade understandings and the like.

(b) The following practices is specifically prohibited:

(1) Offering to sell or rent a refrigerator only on condition that the buyer agree to pay for repairs, parts, and services.

Sec. 6. Tagging. No person shall sell or offer to sell, or rent, a used household mechanical refrigerator unless a tag is attached to the refrigerator which states whether the refrigerator is offered for sale "as is" or "reconditioned," the length of the guarantee to be supplied, the make, model and year of the refrigerator, the maximum selling price; and if the refrigerator is offered for rent, the tag also shall state the maximum monthly rental rate. A tag in the following form is satisfactory:

Make
Model
Year
Condition (Reconditioned)
("as is")
Guaranteed for (90 days)
(one year)
Maximum selling price: \$.....
(Maximum monthly rental rate: \$.....)

This tag must not be removed except by the ultimate consumer. If the maximum price for the refrigerator was determined under paragraph (f) or (g) of Sec. 3, the tag shall so state, and if the refrigerator has a replacement unit, shall carry the name of the supplier of the unit.

Sec. 7. Sales slips, receipts and invoices. Regardless of his former practice, every person selling a used household mechanical refrigerator in the course of trade or business shall furnish the purchaser with a sales slip, receipt, invoice or other writing, stating that the refrigerator sold is either "as is" or "reconditioned", the length of the guarantee supplied, the date of the sale, the make, model, number and year the price charged, the nature and amount of any additional charges, and the name and address of the purchaser. If the maximum price was determined under paragraphs (f) or (g) of Sec. 3, this shall also be stated. A copy of such sales slip, receipt, invoice, or other writing shall be retained by the seller for inspection by the Office of Price Administration.

The Coldspot Electric Refrigerator

Gauge Indications

If the expansion valve is out of adjustment, the pointer will come to rest at some point other than proper value. Reset the expansion valve and allow sufficient time for the unit to respond to the change.

Expansion valve stuck closed—pointer will show a steady high vacuum, unit runs quietly—turning the adjusting screw in, or tapping valve lightly, may or may not break it loose. Flush and reset valve.

Expansion valve stuck open—pointer will not pull down to proper setting, may not pull below 10 or 15 pounds pressure, suction line and evaporator cold but may not form frost, blade click in compressor—flush expansion valve and reset.

Expansion valve sticking—pointer shows wide range of vacuum and pressure as valve opens and closes—flush and reset valve.

Check valve leak—if bad, the pointer will move up the pressure scale slowly, (this way also be caused by restriction in adapter or gauge connection), or the pointer may move up rapidly and then fall off much faster than normal. Check for defrosting of the tail end of the coil and low cutting-in temperature also. Return to factory if check valve leak is not corrected by flushing.

Air in system—indicated by excessive pressure when unit is idle. Check also for restricted air passages or dirty condenser—try purging and if this does not remedy, return to factory.

Restrictions in System

Restricted suction line—very little or no refrigeration at proper vacuum, or steady high vacuum—adjusting expansion valve has little or no effect on vacuum—return to factory.

Restricted discharge line—excessive pressure falling off to almost normal during idle period—return to factory.

Overcharge of refrigerant—excessive pressure—top of condenser *much* hotter than bottom—purge.

Undercharge of refrigerant—little or no

This is the ninth and final of the articles giving detailed servicing instructions on Coldspot Electric Units, compiled from the Service Manual issued by Sears Roebuck & Company, makers of the Coldspot Unit and is published with their permission. This is the first authorized publication of this material and will prove of inestimable value to the thousands of service engineers all over the country who daily come in contact with these refrigerators.

refrigeration at proper vacuum, adjustments on expansion valve reflected instantly on gauge, low pressure when idle, motor spins freely before coming to rest—return to factory.

Low on oil—loses vacuum or will not pull vacuum, may reduce pressure only a few pounds, noisy blades, raising one end of unit may cause oil to circulate and result in normal pump operation; raising other end results in noise and loss of vacuum, continued running causes overload to trip—dump receiver. If evidence of oil leak is found and dumping receiver does not correct, return unit to factory.

Stuck blades—pointer may fluctuate rapidly and regularly, unit may reduce pressure only a few pounds and motor spin before coming to rest.

Flushing expansion valve—if valve is opened when unit is idle, the pointer will not be affected. If opened when unit is running, the pointer will immediately show an increase in pressure. If valve is left open, blade noise results, the motor loads up, and the overload may trip. After backing out the expansion valve adjusting screw, it may take 20 or 30 minutes to pump out the evaporator and pull a high vacuum. Raising one end of the unit aids the pumping action. When the pointer shows a 15 or 20 inch

vacuum with the unit set level, the expansion valve should be reset.

Removing the Gauge

1. Close adapter valve while pointer crosses zero. (While motor is running after idle period).
2. Loosen packing nut on adapter.
3. Unscrew adapter.
4. Test adapter valve with ammonia for leaks.
5. Replace adapter fitting cap.

Expansion Valve Settings

No hard and fast rule can be given for setting expansion valves. Construction of different models, variations in thermostats, and individual desires of the customer must be considered. In general, the settings listed will give satisfaction to the average customer. The corresponding temperatures, as measured by a thermometer frozen to the bottom shelf of the evaporator, for the different vacuums are also given.

Limitations

The gauge, while aiding materially in diagnosing troubles, will not of itself be conclusive. It will not make up for inexperience and poor judgment, nor will it differentiate where several defects have the same effect on the pointer. All symptoms must be taken into account, and the conditions under which the unit is operating considered, in arriving at any conclusion.

Dumping the Receiver

A very useful field operation is given here which is a possible remedy for a number of apparent troubles. Dumping the receiver merely means allowing all of the liquid SO₂ (and oil if present) in the receiver to drain out or "dump" into the evaporator. The following paragraphs describe the best procedure in this operation.

Cover the condenser and run the unit until the compressor is thoroughly warm (about 10 minutes). Close the expansion valve (screw all the way out) for four or five minutes then *stop the motor and open expansion valve*. By listening closely to the sound of the liquid passing through the expansion valve, it is possible to tell when the receiver is empty because the gurgle of liquid turns to the hiss of high pressure gas. Allow the valve to remain open 8 or 4 minutes and then close it completely. Remove the cover from the condenser and start the motor. The

compressor will be very noisy for from 5 to 8 minutes because of the liquid SO₂ which accumulates in the dome. It is often an advantage to stop and start the unit every two minutes during the pump-down. The unit will operate without frost for a time, then frost will appear on evaporator and the unit will cycle. After a few cycles, frost will disappear and the unit will run constantly. The seal should be oiled and the unit should be allowed to operate from 3 to 5 minutes after the frost has disappeared from the separator. (This is the last point to defrost). The expansion valve should now be adjusted and the unit should run until it returns to normal temperature. If the blade noise continues, after several cycles of operation, it will be necessary to return the unit to the factory for repair.

Precautions to Observe

Many considerations are involved in the process of dumping the receiver:

1. *It is desirable to warm the compressor, either by running the unit with the condenser covered or by moderate heating of the compressor with a torch in order to quickly vaporize any liquid that may be drawn into the compressor dome.*

2. *Closing the expansion valve for 4 or 5 minutes with the unit running*, just prior to stopping the unit and dumping the receiver assists in complete emptying of the receiver because the evaporator is completely evacuated. When dumping is used to "flush" or remove dirt from the expansion valve, the flushing action is increased by complete evacuation of the evaporator. This is a second reason for closing the expansion valve for a few minutes.

3. Bearing in mind that the compressor was designed to handle gas rather than liquid and that the evaporator is one continuous tube, it is evident that if the expansion valve is completely opened while the unit is running, the liquid flowing into the evaporator will be drawn through the evaporator into the pump. It is quite probable that the pump will become completely logged with liquid and stall the motor. *It is therefore, better to stop the motor before dumping the receiver* and listen for the hiss of gas through the expansion valve, which indicates that all of the liquid has been removed from the receiver. The valve should then be closed.

4. The oil which circulates with the refrigerant and that which was on top of the

liquid SO₂ in the receiver will be somewhat thick and will tend to adhere to the evaporator tubing. In order to assist in removing this oil from the evaporator, it is good practice to allow the unit to stand idle for a few minutes to permit the evaporator to warm up. The oil will eventually collect in the horizontal portion of the tubing at the bottom of the evaporator and if a tray of warm water is placed on the bottom shelf, the oil will be warmed up and thinned sufficiently to speed up its removal by the pump.

5. Flushing the check valve is accomplished in the operation of dumping the receiver because the liquid SO₂ and oil tend to wash and clean the valve disc and seat of small particles which might cause it to leak.

6. The unit should be operated with the expansion valve completely closed for sufficient time to create a nearly complete vacuum in the evaporator because the oil in the evaporator contains a certain percentage of SO₂ and will be more completely removed if there is sufficient vacuum to cause the SO₂ to boil. The effect of a high vacuum can be observed by the action of a gauge pointer if a gauge is used. (See "Use of Gauge"). It will be observed that the vacuum will come down to about 16 to 18 inches on the gauge with steady progress. At about this point, there will be a series of jerks of the gauge pointer accompanied by noise in the compressor indicating that "slugs" of oil are being drawn from the evaporator.

7. When creating this high vacuum, it should be remembered that the seal bellows is spring balanced for normal operating vacuum, and that there is a chance to draw air or dirt into the seal with this high vacuum. It is, therefore, a good plan to flush off any dirt around the seal by oiling profusely with light mineral oil prior to pumping the evaporator out after dumping the receiver.

8. Compressor lubrication during pump-down is likely to be impaired due to oil being floated above the oil outlet by liquid refrigerant in the dome. Heating the dome slightly with a torch or tipping the unit, will minimize this difficulty. Heating is not absolutely necessary, however, and the unit will pump down nicely if the motor is turned off and on at intervals during the pumping, because it gives the heat of compression a chance to boil off the surplus liquid. The time to turn the unit off can be determined either by gauge or by the sound of the compressor. Whenever the pointer of

the gauge stops moving toward a greater vacuum (or zero) before it has reached a 4 or 5 inch vacuum and the compressor runs with a monotonous rattling sound, the motor should be stopped for 10 or 15 seconds and then started again. Likewise, if the sound of the compressor is observed closely, it will be noted that the noise is maximum when the unit is first started after dumping, and that the noise fluctuates and gradually diminishes as the pump-down continues. If however, the noise becomes a steady clicking, the motor should be stopped and started as before. Tipping the unit as described under "Noisy Compressors" will speed up the pump-down because the noise results from lack of lubrication due to the oil being floated above the oil outlet.

Purging

It is sometimes necessary to "purge" a unit to remove air in the system or an overcharge of SO₂. Air is drawn into the system when a seal leak is present with the unit running at a vacuum. An overcharge of SO₂ occurs only if a Serviceman adds SO₂ to a normally charged unit.

The symptoms of air or an overcharge of SO₂ in the system are: (1) Excessive head pressure with condenser passages clean and adequate circulation for cooling; (2) Reduced refrigeration, long running cycle; (3) Compressor, condenser and receiver very hot; (4) Motor overload cutting out.

Do not purge a unit in the customer's home. Take it outside or back to the shop. To purge the system use the gauge adapter in the port at the top of the receiver. Install adapter as described under "Use of Gauges". Attach rubber hose or copper tubing to adapter and submerge other end of hose or tubing in a bucket of lye water. (Solution made by dissolving a few ounces of lye in a gallon of water). This solution will neutralize the SO₂ which will inevitably escape. If this solution is not used, any grass, flowers, or shrubs will be killed in the vicinity and birds or small animals will be affected. Do not take this chance. After letting unit stand idle a few minutes, open the valve in the receiver dome slightly while the unit is off. Any air present in the sealed system will escape because it is lighter than SO₂ and will be trapped in the top of the receiver under pressure.

The amount of gas and air that is allowed to escape can only be determined by ex-
(Concluded on page 60)

Neighborhood Baker Sells Frozen Dough

REUTING the old theory that frozen yeast is unproductive, a new line of frozen raw ready-to-bake doughs, known as "Frigid Dough" has been introduced by E. Gordon Male of Oak Park, Ill. The product and process was described in a recent issue of *Baker's Helper*.

In July 1944, with seven years of experiment behind him, Mr. Male began to sell a few Frigid Dough products. They were sold through Pearson's Bakery, 1046 Chicago Ave., Oak Park, Ill., of which Mr. Male is owner and manager. The first varieties were limited to cloverleaf and Parker House rolls, a small variety of sweet rolls, and pie, bread and roll dough. Customer demand and satisfaction was immediate and sales steadily increased. Experiments on other products were continuing and in December 1944 Frigid Dough products opened its own store at 1118 Chicago Ave., across the street from its original home in Pearson's Bakery. Both stores are now owned and managed by Mr. Male.

In 1937, Mr. Male, then located in Minonk, Ill., conceived the idea of selling such products. Making up small batches of dough, he first froze them in the unit of his home refrigerator. After various lengths of refrigeration, the dough was thawed and then baked and compared with the identical product processed in the usual methods of the bakery.

Freezing Yeast

Professional opinion was definitely opposed to the theory back of the experiments, doubtful of the outcome of any attempt to freeze and then successfully use yeast dough. Repeated experiment was necessary to prove and reprove the fact that yeast could be frozen and yet when thawed give satisfactory fermentation. Early in the process it was discovered that formulas would have to be adjusted to fit the new processing. Every

Frigid Dough product has a formula which was developed by Mr. Male.

Neighbors were called in to help with the next step in development. They were given the products that had been frozen in the unit of the home refrigerator. Each housewife voiced her opinion as to the probable success and the usefulness of such products.

Professional yeast men are still amazed at the results. The impossible has been accomplished. They still come to see Frigid Dough as it is processed. Even lately a yeast salesman warned Mr. Male that the yeast at Pearson's Bakery was frozen and he had better buy new yeast for best results. Mr. Male took him across the street to see yeast products that were "Frigid."

There are four steps in the processing of



Mr. and Mrs. Male in the front office of their bakery salesroom

Frigid Dough, which name is registered as a trade mark; mixing, special processing, freezing and packaging. All are accomplished in one room, which resembles the usual bakery shop except that the refrigerators replace the oven and proofing room.

Freezing Equipment

A total of about 1,500 cubic feet of freezer space and 1,000 cubic feet of refrigerated storage is used. The freezing equipment consists of one reach-in 220 cubic foot cabinet freezer with four side doors, with 1½ hp. Copeland unit; three cabinet freezers of 24 cubic feet each, with 1½ hp. General Electric

unit; four frozen food cabinets which are in the store; and a walk-in refrigerator with $\frac{1}{2}$ hp. Frigidaire unit.

The cooler or holding room measures 9x20x7 ft. with six inches of insulation. After freezing, the packaged bakery goods are stored to await shipment. This room is held at a temperature of minus 10° F. Refrigeration is furnished by a 1 $\frac{1}{2}$ hp. Frigidaire Freon water cooled compressor. Dole plate shelf stands are used, four shelves high. There are twelve 22x60 inch and eight 22x108 inch Dole plates in this room.

As previously noted, each Frigid Dough product is prepared according to the special formula developed by Mr. Male. When it is

completely prepared it is quick-frozen at minus 10° to minus 40° F. until frigid. This period varies with the amount of space that is filled and can be hastened if necessary with extra mechanical aid.

Products Packaged

When the products are completely frigid they are packaged in compact boxes which are wrapped in moisture-proof paper to insure their keeping for a longer period. Pies are frozen in a re-inforced paper pie plate and are also wrapped in moisture-proof paper, then boxed in attractive white boxes with the name of the pie printed in bright red. Cup



These frozen dough items, including pies, cakes, coffee cakes, rolls and cookies neatly stacked in refrigerator are ready for sale at Pearson's Bakery



Cooler or holding room where Frigid-Dough products are stored before shipping

cakes and muffins are frozen and packaged in souffle cups and are baked in the same cups at home. Each item is prepared with an eye to attractiveness but is efficient and compact. The boxes lend themselves to long storage in home units or lockers.

Variety of Products

Customers find there is always a large variety of products to select from. This is possible because of the keeping quality of Frigid Dough. Pies are made every day by two experienced bakers. Only fresh-frozen semi-sweetened fruit is used and there are always eight favorites to choose from. During the Christmas holidays nearly 400 pies were sold. Besides fruit pies there are also chicken and turkey pies.

Cakes, rolls, muffins, cup cakes, cookies, coffee cake, and bulk dough are made less frequently, but in large amounts and always on hand. There are three varieties of cake; white, devil's food and angel food, which can be baked frozen. Maybe that's one of the reasons Mr. Male introduced these novel products to the housewife with the slogan "It's fun to bake the modern way."

Cookies are made in two types, the drop

cookies and bar or icebox cookies. Each type comes in four varieties—restriction of sugar keeps these types limited. The future promises many varieties of fancy party cookies and lunchbox favorites.

Cup cakes and muffins come in several popular kinds. Blueberry and cornmeal muffins are baked without defrosting and there are, of course, the ever popular cup cakes which can be slipped onto a cookie sheet and popped into the oven whenever the cook desires.

At the present time there are three other retail outlets for Frigid Dough Products: Kenwood Foods, in Hammond, Ind.; Deep Freeze, in Hubbard Woods, Ill.; and Marshall Field & Co., ninth floor, Chicago, Ill. There have been a few shipments made to Kansas City and to Washington, D. C. The shipment to Washington was fresh cherry pies. A hundred or so of these pies were shipped for TWA banquets, where they won many new customers for Frigid Dough. People who have tasted the product call from all parts of the country to know whether Mr. Male can furnish their locality with Frigid Dough. One wishful customer went so far as to find some containers.

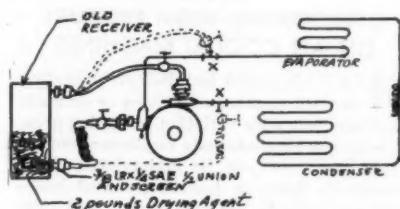
SERVICE POINTERS

Practical Solutions of Your Service Problems

THIS department is an aid to service engineers who are seeking new devices or methods to improve their work. All the service pointers have been supplied by the subscribers. THE REFRIGERATION SERVICE ENGINEER invites readers to submit "down-to-earth" practical service and installation information. Five dollars will be paid for each pointer published. Every service engineer has one or more "kinks" that have proved useful in every day practice. Here is your opportunity to exchange service pointers with the other fellow and earn \$5.00 for the information. Write up your idea today and mail it to the Service Pointer Editor.

PORTABLE DRYING UNIT

A VERY handy device for removing moisture from hermetic or semi-hermetic systems can be made from an old receiver. The receiver is first cleaned out and the openings are refitted with fittings as illustrated. About two pounds of drying agent are put into the container by removing one of the fittings. From the outlet protected by a screen, a Crosley capillary tube is attached. A charging hose or piece of tubing can be used as the inlet.



When a system is to be dried, connect as shown in the diagram. If no service valves are on the system, the discharge and suction lines will have to be cut and tees sweated in for the connections. The auxiliary lines can be pinched off and soldered after the drying operation.

The dryer can remain on the system for several days to assure all the refrigerant passing through it more than once. Maximum drying speed will be obtained by opening the refrigerator door to maintain a high evaporator temperature. Submitted by Wm. R. Pawley, Lincoln, Nebr.

A WARTIME SUBSTITUTION

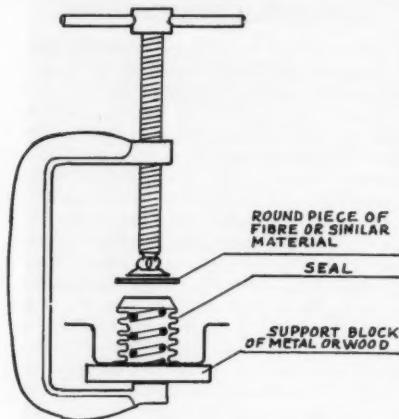
ON a foreign warship some months ago, we ran into quite a problem. This ship had always had refrigeration trouble and had lost a large portion of its supplies each time the patrol came through here. We have checked this ship twice since and their troubles are over. This is what we did when a substitution of material became necessary.

The units and boxes are three decks below. There are three machines: a one ton machine to take care of a large water cooler and dairy box, a second one-ton machine for an extra large walk-in meat box and fish room, the third, a 1½-ton machine for a large vegetable and meat storage room. These machines are all air cooled and the supply of air to the units was not enough to carry the load in this warm climate. We wanted to use more blowers, but due to the wartime conditions, we were unable to procure them within the time limit. The machines ran continuously, the head pressure between 185 to 220 pounds, and used Freon-12. We had to act quickly as the time was limited and we had to use what material was available.

By cutting the ends from a 150 pound Methyl Chloride drum and inserting three individual 80 ft. coils of $\frac{1}{2}$ in. o.d. copper tubing with an inlet and outlet of each coil extending from the end of the drum which had been covered with a $\frac{1}{4}$ -in. steel covering by electric welding it to the drum and silver soldering around the copper tubing. Water was forced through the drum from the lower side and out at the top, making three water cooled condensers in one. By continuing to use the air cooled condenser the Freon flowed from these condensers through the water cooled condenser and back to each receiver. If at any time the water pump failed for this set up, the air cooled system would continue to operate without it. Also the water system could be cut out while in a cooler climate. With this arrangement the head pressure was about 150 pounds with some off cycle on all three machines. Submitted by H. L. Alspach, Key West, Florida.

BELLOWS SEAL REPAIRING

WHEN the nose of an internal spring type bellows seal is found improperly soldered to the bellows, it can be resoldered without the use of special jigs. A suitable jig can be made from an ordinary "C" clamp.



The clamp can be held by a vise as shown in the drawing. The seal is then compressed between a block at the bottom and a piece of fibre or similar material on the nose of the seal. This permits soldering to be done without damage to the parts or obstruction to the soldering. *Submitted by Ruby Robinson, Brooklyn, N. Y.*

STEWART-WARNER DIAGNOSIS

THE 1941 Stewart-Warner dual-temp refrigerator is designed so that loss of gas will cause no locker refrigeration. When this occurs check for drops of oil on top of the water in the glass drip tray. The majority of complaints of no locker refrigeration can readily be diagnosed in this manner.

The leak occurs in the evaporator tubing so it is necessary to replace the plate evaporator and recharge. The total charge is: 14 ounces for 6 cubic foot box and 15 ounces for the 8 cubic foot box.

Another point to check on the Stewart-Warner unit either the hermetic or the dual-temp, is the rubber support bushings. When these bushings lose their resilience the unit becomes noisy. Replace the three bushings with a new unit kit, number n00921. *Submitted by E. L. Maneval, Wilkes-Barre, Pa.*

EMERGENCY MOTOR MOUNTS

I HAVE found a very satisfactory substitute for the rubber bushings in special moulded shapes, used for motor mounts. These have been very hard or impossible to obtain in past months and rare indeed is the service job that doesn't find one or more of these cushions ruined by over oiling of the motor. No service job is complete if left with a rattling motor mount. Some of these substitute cushions are in use after a year's service or more and still look good for more years.

Common electricians rubber tape is used. It can be used alone but a much better method is to just use enough to cover a wrapping of cheap reclaim sponge rubber pulled tightly and wound on in sufficient bulk to duplicate the O.D. of an original bushing. This electricians rubber tape which is self adhesive holds the other rubber in place. The bushing is then forced into the hole in the motor shell with a screw driver and motor replaced in the stand. The motor is as quiet as though a new bushing were used. This half round sponge rubber has been obtainable throughout the war at about 12 ft. for 35 cents. Old pieces of garden hose, scrap rubber from tires and many other odds and ends such as tube covering sponge insulation can be used to make a bushing with only a few inches of rubber tape. *Submitted by Thomas J. Doolin, Richmond, Wash.*

OVERCOMING HIGH PRESSURE ON AIR COOLED MACHINES

MANY air cooled installations operating at peak summer conditions or on loads that require a wide variation in suction pressure do not have adequate condenser cooling. Head pressures can be maintained within reasonable limits by installing a heat interchanger between the compressor and condenser. Connect so that the suction passage is used for refrigerant. Connect the liquid line connections to a water supply so that the interchanger acts as a counterflow condenser.

A water regulating valve can be used by setting it to open above normal condenser pressure. This will permit the water to flow only when necessary. If the unit is located in an exposed place, the water lines should be drained for winter operation. Both the inlet and outlet lines should be drained. The interchanger will soon evaporate the water remaining in it. *Submitted by Frank Depagnier, City Island, N. Y.*

Refrigeration Section Included in The New St. Louis Building Code

THE latest addition to the St. Louis building code pertaining to refrigeration systems was approved on March 6, 1945, and published the following March 18th in The City Journal—Volume 27, Number 48. The following excerpts of interest to refrigeration, installation and service men are published here.

ORDINANCE NUMBER 43114

Refrigeration Inspection

The Section of Mechanical Equipment is hereby charged with inspection of all refrigeration installations in accordance with this Section. The said section and the exercise of its function shall be in charge of and controlled by the Supervisor of Mechanical Equipment.

Insurance Company Inspectors

Who have qualified before the Committee of Boiler Rules set forth in Sub-section 97-20 as boiler inspectors shall inspect all refrigeration equipment insured by their respective companies. The owner or user of such refrigeration equipment shall be exempt from the payment of inspection fees to the City of St. Louis. Each special Inspector shall submit upon forms, approved for such purposes, to the Supervisor of Mechanical Equipment a written report of each inspection of such refrigeration equipment within twenty days from the date of inspection.

Permits for Refrigeration Equipment Installations

The installation or alteration of any refrigeration plant equipment on any premises or in any structure in the City of St. Louis, is forbidden until the owner or lessee, or his agent, architect or engineer, shall have submitted to the Supervisor of Mechanical Equipment on such forms as he may approve, an application accompanied by plans and drawings showing the proposed construction, equipment, mode of operation, type and quantity of refrigerant, and such application has been approved and a permit issued by the Supervisor of Mechanical Equipment.

Ordinary repairs and replacements to the equipment mentioned in the preceding paragraph may be made in accordance with the provisions of this Section without filing such an application, except when such repairs or replacements involve a change in use, classification, operation, control, character of power supply, capacity, or the speed of compressors.

Plans and Specifications

The Supervisor of Mechanical Equipment may require plans and specifications of any work projected. If the plans and specifications meet with his approval, he shall endorse the original plan or plans as approved, and shall issue a permit for the construction thereof; and he shall file, in convenient form for reference, the duplicate of the plan or plans. If the plans submitted are not in accordance with the requirements of this Section, he shall reject same and shall state the ground of rejection. He shall give general information and advice as to the meaning and requirements of this section relating to such work to persons requesting the same.

Certificates

It shall be unlawful for the owner or lessee to operate or permit the operation or use of any refrigeration equipment, or appurtenances thereto, until a certificate has been obtained from the Supervisor of Mechanical Equipment that such device has been inspected and found to be safe. Within a reasonable time after being requested to do so, the Supervisor of Mechanical Equipment or his authorized representative shall inspect any device hereafter installed or constructed. If such device is found to be safe and in conformity with the provision of this Section, a certificate to that effect shall be issued. The certificate of operation shall be posted on the premises in the Machinery room in a conspicuous place and shall be under glass in a suitable frame.

Record of Refrigeration Equipment

A docket of all refrigeration equipment shall be kept, giving a description of its location sufficient for identification, together with information as type of system, capacity, refrigerant used, design working pressure, prime mover, inspection and so forth, as the Supervisor of Mechanical Equipment may deem desirable.

Inspection

The Supervisor of Mechanical Equipment or his duly appointed inspectors shall be and is hereby authorized and directed to inspect all refrigeration installations in the City of St. Louis and for that purpose to enter any structure or premises during reasonable hours for the purpose of ascertaining whether or not such equipment conforms to this Section. The Supervisor of Mechanical Equipment shall cause all refrigeration equipment to be inspected once annually in accordance with this Section. Upon notice from the Supervisor of Mechanical Equipment any repairs found necessary to compressors, condensers, absorbers, accumulators, evaporators, generators, receivers, pressure relief devices, piping or any part of system, shall be made without delay by the owner or lessee. If defects are found which would make the continued use of such mechanical equipment unsafe for operation, the use of such mechanical equipment shall cease, and it shall not be used again until the Supervisor of Mechanical Equipment certifies that it has been made safe. After every inspection which shows any refrigeration system to be safe and in conformity with the requirements of this Section, the Supervisor of Mechanical Equipment shall issue a certificate to that effect.

Capacity of Plant

For the purpose of determining the capacity of a refrigeration plant, the following method is to be used:

When the refrigeration equipment is used for cold storage and process work the capacity shall be calculated on the basis of saturated vapor with a condenser temperature of eighty-six degrees Fahrenheit and an evaporator temperature of five degrees Fahrenheit using the displacement of the compressor or compressors to obtain volume.

When the refrigeration equipment is used for air conditioning the same calculations shall be used except that an evaporator temperature of forty degrees Fahrenheit shall be used.

Required Fees

The fee to be paid for a permit to install or alter a refrigeration plant having a capacity of twenty

five tons or less shall be Two Dollars. The fee to be paid for a permit to install or alter a refrigeration plant in excess of twenty-five tons capacity shall be Five Dollars.

The following inspection fees shall be paid:

Up to and including three tons of refrigeration	One Dollar
Over three tons and up to and including ten tons refrigeration	Two Dollars and Fifty Cents
Ten tons up to and including twenty-five tons refrigeration	Five Dollars
Twenty-five tons up to and including one hundred tons refrigeration	Ten Dollars
One hundred tons to three hundred tons refrigeration	Fifteen Dollars
Three hundred tons to one thousand tons refrigeration	Twenty-five Dollars
Over one thousand tons refrigeration	Thirty-five Dollars

The fees for certificate of operation shall be One Dollar when the inspection is made by an insurance company inspector. The above fees shall be paid in advance to the issuance of the certificate of operation.

One ton of refrigeration shall mean the removal of heat at the rate of 12,000 Btu. per hour.

Exemptions

This Code shall not apply to refrigeration systems subject to inspection under Federal Law or under the jurisdiction of the United States; or to systems of refrigeration having a capacity of one ton or less; or to refrigeration systems where the largest compressor of refrigeration does not exceed five tons when such systems are located in one family and two family dwellings. Annual inspections shall not be required for refrigeration systems located in one family and two family dwellings.

Unit systems, where the largest compressor of refrigeration is five tons or less, shall be exempt from annual inspections.

This Code shall not apply to evaporators of one ton capacity or less, connected to pipe line refrigeration supplied from a central refrigerating plant.

Evaporators of five tons or less, connected to pipe line refrigeration supplied from a central refrigerating plant, shall be exempt from annual inspections.

Existing Installation

Refrigeration equipment legally installed prior to the adoption of this Section may be used without being reconstructed to comply with all the provisions of the rules for new installations, provided ample public safety is maintained by the owner and the owner keeps the equipment in a safe operating condition.

Scope and Purpose

(1). SCOPE. The application of this Section is intended to insure the safe design, construction and installation, inspection and operation of every Refrigerating System employing a fluid which is vaporized and liquefied in its refrigerating cycle, which may be used for the extraction of heat, including refrigeration for the preparation and preservation of food, the cooling and dehumidification of air for industrial purposes and comfort, and as an aid to or a part in a chemical process.

(2). This Section shall apply to Refrigerating Systems installed subsequent to its adoption and to parts replaced or added to systems installed prior to its adoption.

(3). PURPOSE. This Section is intended to provide reasonable safeguards to life, limb, health and property; to correct certain practices which are inconsistent with safety; and to set forth standards of safety which will influence but not retard future progress and developments in Refrigerating Systems.

Refrigerants

For refrigerants not listed in Table No. 112A the test pressure for the high pressure side of the refrigerating system shall be not less than the saturated vapor pressure of the refrigerant at 150° F. and the test pressure for the low pressure side

TABLE No. 112A

	Minimum test pressure, lbs. per square in. gauge		Maximum quantity in lbs. per 1000 cu. ft. of air conditioned space, in a Direct System used for Comfort Cooling.
	High Pres. side	Low Pres. side	
Ammonia NH ₃	300	150	0.2
Butane C ₄ H ₁₀	90	50	3
Carbon dioxide CO ₂	1500	1000	12
Dichlorodifluoromethane (Freon-12) CCl ₂ F ₂	235	145	30
Dichlorotetrafluoroethane (Freon-114) C ₂ Cl ₂ F ₄	80	50	40
Dichloromethane (Carrene No. 1) (Methylene chloride) CH ₂ Cl ₂	30	30	2
Dichloromonofluoromethane (Freon-21) CHCl ₂ F	70	50	13
Dichloroethylene C ₂ H ₄ Cl ₂	30	30	2
Ethane C ₂ H ₆	1100	600	3
Ethyl chloride C ₂ H ₅ Cl	60	50	2
Isobutane C ₃ H ₈	130	75	3
Methyl chloride CH ₃ Cl	215	125	1
Methyl formate C ₂ H ₄ O ₂	50	50	2
Propane C ₃ H ₈	325	210	3
Sulphur dioxide SO ₂	170	95	0.5
Trichloromonofluoromethane (Freon-11) CCl ₃ F	50	30	35
Monochlorodifluoromethane (Freon-22) CHClF ₂	300	150	45

of the refrigerating system shall be not less than the saturated vapor pressure of the refrigerant at 115° F. In no case shall the test pressure of a refrigerating system be less than 30 pounds per square inch gage.

For refrigerants not listed in Table No. 112A the maximum quantity of refrigerant in pounds per 1000 cubic feet of air conditioned space, in a Direct System used for Comfort Cooling, shall be determined by the proper authorities having jurisdiction over the administration of this Section.

Machinery Rooms

(1). Refrigerating machinery rooms shall comply with the following requirements:

(2). Each refrigerating machinery room shall be provided with at least one easily accessible, and unobstructed exit, and be provided with means of ventilation to the outer air. The ventilation shall consist of a window or windows or other apertures opening directly to the outer air, or mechanical means capable of exhausting any contaminated air from the room to the outside of the building.

(3). When a window or windows or other apertures are used, the total area which can be opened shall not be less than that specified in Table No. 112B.

(4). When mechanical means are used, they shall consist of a power driven exhaust fan which shall be capable of removing from the refrigerating machinery room the amount of air specified in Table No. 112B. The outlet of the fan shall terminate outside of the building. When air flues are used on either the inlet or discharge side of the fan, they shall have an area not less than that specified in Table No. 112B. Adequate means must be provided for the replacement of the exhausted air.

(5). Machinery rooms having mechanical means of ventilation shall have the power control for the mechanical means of ventilation located outside of the refrigerating machinery room.

(6). No refrigerating system, or part thereof, shall be installed in or on the stairway, halls, lobbies, entrances or exits of any building, except a system containing not more than 6 pounds of a refrigerant.

TABLE No. 112B

	Pounds of Refrigerant in System	Mechanical discharge	Mechanical Flue Area	Window area in sq. ft.	Door area in sq. ft.
Up to	20	150	3/4	4	
	50	250	1/2	6	
	100	400	1/2	10	
	150	550	2/3	12 1/2	
	200	680	2/3	14	
	250	800	1	15	
	300	900	1	17	
	400	1,100	1 1/2	20	
	500	1,275	1 1/2	22	
	600	1,450	1 1/2	24	
	700	1,630	1 1/2	26	
	800	1,800	2	28	
	900	1,950	2	30	
	1,000	2,050	2	31	
	1,250	2,250	2 1/2	33	
	1,500	2,500	2 1/2	37	
	1,750	2,700	2 1/2	38	
	2,000	2,900	2 1/2	40	
	2,500	3,300	2 1/2	43	
	3,000	3,700	3	48	
	4,000	4,600	3 1/2	55	
	5,000	5,500	4 1/2	62	
	6,000	6,300	5	68	
	7,000	7,200	5 1/2	74	
	8,000	8,000	5 1/2	80	
	9,000	8,700	6 1/2	85	
	10,000	9,500	6 1/2	90	

*** Refrigerating System Requirements**

(1). Every refrigerating system shall comply with the following requirements:

(2). All refrigerating systems or component apparatus shall be maintained in a cleanly manner, free from oil, dirt, waste and debris and shall be kept readily accessible at all times and adequately illuminated.

(3). No direct system may be used for comfort cooling when the total amount of refrigerant contained in the system exceeds 1000 pounds or where the rated capacity of the refrigerating system exceeds 100 tons of refrigeration.

(4). In a direct system used for comfort cooling the maximum quantity of refrigerant shall be limited by the volume of the space to be air conditioned in accordance with the quantity specified thereafter in Table No. 112A.

(5). All direct systems used for comfort cooling and having a rated capacity of more than 10 tons of refrigeration shall have a positive automatic fire damper or dampers to cut off the refrigerating apparatus from the duct system or the space being cooled and automatic means to close the damper or dampers and to stop the fans at a temperature of 210° F.

(6). No brine shall be used that will generate flammable vapor at a temperature below 150° F. when tested in an open cup tester, except in a closed circulating system.

(7). Systems containing more than 75 pounds of refrigerant shall be equipped with an auxiliary emergency control switch or other device which shall be located outside of the machinery room, and be readily accessible, to stop the action of the pressure imposing element or the flow of refrigerant from an outside source.

(8). Each electrically operated system requiring $\frac{3}{4}$ HP or over shall be protected by a pressure limiting device located on the high pressure side of the system, set to stop the pressure imposing element at a pressure lower than the pressure relief valve setting. When the prime mover is other than electrical a high pressure alarm must be installed.

(9). Each system requiring less than $\frac{3}{4}$ HP shall be provided with either a pressure limiting device or an overload relay or time relay fuse protection.

(10). Every refrigerating system other than a unit system refrigerator or a system containing 6 pounds or less refrigerant shall be tested and proved to be tight before being operated. The high and

low pressure sides of such refrigerating system shall be tested with a pressure not less than the values shown in Table No. 112A for the high and low pressure sides, for the particular refrigerant employed in such system.

(11). All positive displacement compressor discharges, condensers, receivers, absorbers, generators, shell and tube type coolers, accumulators, surge drums and apparatus of like character, when connected to a system containing 20 pounds of refrigerant or over, shall each be protected from over pressure by a pressure relief valve.

(12). When a shut-off valve is located between a pressure relief valve and that part of the system protected thereby, such shut-off valve shall be sealed open and shall be closed only for the purpose of making repairs, and when such relief valve is removed for any cause it must be replaced immediately.

(13). The discharge from pressure relief valves must be piped to the outside of the building to discharge in a safe manner, not less than twelve feet above ground, and not closer than twenty feet to any fire escape, except that the discharge of the relief valve on the discharge of a compressor may be connected to the suction of the compressor between the suction shut-off valve and the low side. The discharge from more than one pressure relief valve may be run into a common header large enough to handle at least the volume of the three largest relief valves connected to it. The common header pressure shall be relieved by a pressure relief valve or valves to the atmosphere or by other suitable method for relieving excess pressure therein, so that the pressure therein is maintained at not to exceed ten per cent of the values set forth in Table No. 112A. Any such common header must be clear between the relief valves discharging into it and the relief valve or valves discharging out of it.

(14). Pressure relief valves shall be placed about the liquid refrigerant level and set to relieve at no more than the values in pounds per square inch gage as set forth in Table No. 112A for the high and low pressure sides respectively.

(15). The pipe size of the pressure relief valve, excepting on a compressor discharge, shall be not less than shown in the following Table No. 112C.

TABLE No. 112C.

Nominal Outside Diameter of Shell	Minimum Valve
Up to 8"	1/4"
Over 8" and up to 12"	3/8"
" 12" and up to 16"	1/2"
" 16" and up to 24"	3/4"
" 24" and up to 30"	1"
" 30" and up to 36"	1 1/4"
" 36" and up to 42"	1 1/2"
" 42"	2"

When a pressure relief valve larger than $\frac{3}{4}$ " is required, a number of smaller valves of equivalent or greater orifice area may be substituted.

(16). Each pressure relief valve shall be sealed and labeled by an easily legible metal tag designating its setting in pounds per square inch gage and the name of the manufacturer thereof.

(17). A rupture member of the same size may be substituted for, or used in series with a pressure relief valve. Such rupture member shall have attached to it an easily legible metal tag designating its rupture pressure in pounds per square inch gage and the name of the manufacturer thereof.

(18). The materials used in a refrigerating system shall be unaffected by the refrigerant used. Piping, tubing and fittings shall be of a thickness adequate for the pressure of the refrigerant used as stated in Table No. 112A and such external physical strains which may reasonably be expected.

(19). All piping, tubing or vessels containing refrigerant shall be adequately supported in a workmanlike manner by metal hangers or other fireproof material.

(20). Liquid gage glasses, except those of the bull's-eye type, shall have automatically closing shut-





YOU Refrigeration Service Engineers know from long, hard experiences what it means to install Refrigerant Valves in tight places — where inches count in placing and adjusting a valve on the line.

Add to this the universal comment that when an "A-P" Valve is installed it keeps on functioning with trouble-free regularity. From the letters we receive it becomes apparent why refrigeration service men everywhere agree — "A-P" Valves are DEPENDABLE. Every unit precision-built — pre-tested.

AUTOMATIC PRODUCTS COMPANY
2454 N. 32nd STREET • MILWAUKEE, WISCONSIN

Consult "A-P"

*about your service problems.
Ask for latest illustrated Bulletins.*

DEPENDABLE Refrigerant Valves

*Stocked and Sold by Good Refrigeration Jobbers Everywhere — Used and Recommended by
Refrigeration Service Engineers*



off valves and such glasses shall be adequately protected against injury by slotted metal casings.

(21). All hand operated valves, the purpose of which is not immediately self-evident, must be properly and legibly marked or tagged. All valves must be readily accessible.

(22). Not more than 200 pounds of refrigerant and in containers as required by the Interstate Commerce Commission for the transportation of refrigerants shall be stored in the machinery room. Containers should be stored in a cool dry accessible place, away from steam radiators, furnaces, stoves or other sources of heat and should be securely blocked in position so that they cannot cause damage by rolling.

(23). Every system which may be charged after installation shall have the charging connections located on its low pressure side, but not directly into the compressor or suction line. No container shall be left connected to a system except while charging or withdrawing refrigerant.

(24). Refrigerants shall be withdrawn from or charged into a refrigerating system only by qualified refrigeration servicemen or by, or under, the supervision of an engineer qualified in refrigeration.

(25). Refrigerants withdrawn from refrigerating systems shall be transferred to containers as prescribed by the regulations of the Interstate Commerce Commission for the transportation of such refrigerants.

(26). The containers from which refrigerants are discharged into or withdrawn from the refrigerating system must be carefully weighed each time they are used for this purpose and the containers must not be filled in excess of the permissible filling weight for such containers and such refrigerant as set forth by the Bureau of Explosives of the Interstate Commerce Commission. No heat, in any form, shall ever be applied to a container for the purpose of hastening the discharge of its contents. No refrigerant shall be transferred from one container to another except as provided in this paragraph.

(27). One mask or helmet shall be required where amounts of refrigerant between 100 pounds and 1000 pounds inclusive are employed. If more than 1000 pounds of refrigerant is employed at least two masks or helmets are required. Only complete helmets or masks marked as approved by the U. S. Bureau of Mines and suitable for the refrigerant employed shall be used and shall be kept in a suitable cabinet immediately outside of the machinery room or other approved accessible location.

(28). Canisters or cartridges for masks or helmets shall be renewed immediately after having been used or the seal broken and if unused, must be renewed at least once every two years. The date of filing shall be marked thereon.

(29). Refrigerant containing vessels which are not a part of equipment listed by a recognized engineering testing laboratory having a follow-up inspection service, shall be constructed in accordance with the rules of Section VIII (Unfired Pressure Vessel Section) of the 1937 A.S.M.E. Boiler Construction Code, and subsequent addenda and revisions thereof, except that compliance with paragraphs U-2 to U-10 inclusive of the aforesaid A.S.M.E. Code shall not be required. For the purposes of this paragraph 80% of the pressures specified in Table No. 112A shall constitute the pressures on which the design working pressure shall be based.

Installation Requirements

(1). CONDENSING UNIT INSTALLATION REQUIREMENTS. Not more than two self-contained condensing units shall be located one above the other within the same floor area between floor and ceiling.

(2). All moving machinery shall be provided with adequate guards in accordance with the Code for Mechanical Power Transmission Apparatus, Designation B. 15-37.

(3.). Adequate illumination and space for inspection and servicing of condensing units shall be provided.

(4). Condensing units with enclosures shall be readily accessible for servicing and inspection.

(5). WATER CONNECTIONS. No connection shall be made with the City water supply which is inconsistent with the regulations of the public authority having jurisdiction. Water used for removing heat from a Refrigerating System shall not be discharged into any water supply where the water is used for human consumption.

(6). Discharge water lines from condensers or other equipment shall not be directly connected to the waste or sewer system in such a manner as to permit siphoning of the waste water into the water supply lines. The waste or discharge from such equipment shall be over and above the rim of a properly trapped and vented plumbing fixture.

(7). ELECTRICAL WIRING. The installation of all electrical equipment and wiring shall be in accordance with the requirements of the Electrical Code of the City of St. Louis.

Design, Construction and Safety Devices

(1). DESIGN AND CONSTRUCTION. Every part of a Refrigerating System shall be designed, constructed and assembled to withstand safely and without injury the required minimum test pressures specified in Table No. 112A.

(2). COMPRESSOR. Compressor of systems containing more than twenty pounds of refrigerant shall be equipped with a pressure relief device located between the pressure imposing element and the stop valve on the discharge side. Such relief device must be of such size as to keep the compressor discharge pressure within safe limits with the compressor discharge shut-off valve closed. The discharge from such relief device may be piped to the atmosphere or vented into the low pressure side of the system.

Tests

(1). TESTS. Every refrigerant containing part of every system that is erected on the premises, except compressors, safety devices, pressure gages, control mechanisms and other component parts, that are factory tested, shall be tested and proved tight after complete installation and before operation under the minimum pressures shown in Table No. 112A.

(2). POSTING OF TESTS. A dated declaration of test, signed by the installer, shall be mounted in a frame, protected by glass, and posted in the machinery room. If an inspector is present at the test he shall also sign the declaration.

(3). TEST MEDIUM. No oxygen or any combustible gas or combustible mixture of gases shall be used for testing.

Instructions

(1). INSTRUCTIONS. It shall be the duty of the person in charge of the premises on which a Refrigerating System containing more than twenty pounds of refrigerant is installed, to place a card conspicuously as near as practicable to the refrigerant condensing unit giving directions for the operation of the system, including precautions to be observed in case of a breakdown or leak as follows:

(a) Instructions for shutting down the system in case of emergency:

(b) The name, address and day and night telephone number for obtaining service;

(c) The name, address and telephone number of the Municipal Inspection Department having jurisdiction and instructions to notify said department immediately in case of serious leakage or other emergency.

(2). SIGNS. Systems containing more than one hundred pounds of a refrigerant should be provided with suitable signs designating the main shut-off valves to each vessel, main steam or electrical control, remote control switch, and pressure-limiting device. On all exposed high pressure and low pressure piping in each room, where installed outside the machinery room, shall be signs as above with the name of the refrigerant and the letters HP or LP.

(3). MARKING. Each refrigerant condensing unit shall carry a nameplate marked with the manufacturer's name and address, model number, name of refrigerant used, and the manufacturer's test pressure applied.

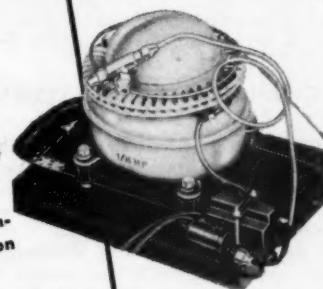
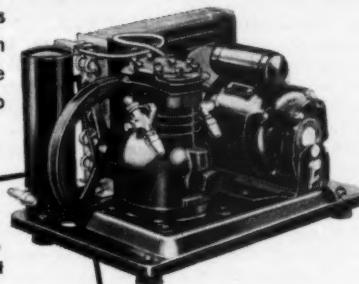
Leadership

.. is an un-answerable argument

The customer list of Tecumseh Products Company reads like "Who's Who" in Refrigeration. The brand names are "Tops" in the industry. Why this swing to Tecumseh?

The Answer is Four-Fold!

- 1 An Outstanding PRODUCT! Hermetic and conventional condensing units and compressors, for all types of equipment, designed on sound engineering principles for long trouble-free operation, efficiency and freedom from noise and vibration.
- 2 An Efficient PLANT! A distinctive achievement in the application of line production to fine precision tooling, skilled workmanship at lowest cost consistent with highest quality.
- 3 A Sound Sales POLICY! No completed products — no competition with customers.
- 4 An Attractive PRICE! The price schedules on Tecumseh Units have always been at least competitive—often low. This has resulted from low costs due to large production on automatic, single purpose tools.



Write or Wire Today
for Complete
Information

Chieftain
CONDENSERS COMPRESSORS



TECUMSEH
PRODUCTS CO.
TECUMSEH, MICH.

QUESTIONS AND ANSWERS

On Problems of Servicing, Installation and Maintenance of Household and Commercial Refrigerating Equipment—Send Your Problems to the Question Box.

COMMENTS ON QUESTION No. 670

I WAS interested in reviewing the question and the answer given with reference to piping two condensing units in multiple as illustrated in the June issue.

What was said in response to the question was in our estimation, satisfactory as far as it went, but I thought you would want to know that in our experience we have found it necessary to "equalize" the receivers in the same manner that the compressor crank-cases are equalized. In this manner we have been able to avoid "damming" of liquid in one receiver due to a partial difference in pressure. I thought you might find this of interest.

I might say in passing, however, that we have only suggested resorting to multiplexing of condensing units where this proved to be the only alternative, for we have found there is apparently a potential maintenance hazard that no amount of special interconnections, adjustments, etc., can be depended upon to entirely eliminate in every instance.—C. L. Olin, Ass't Sales Manager, Servel, Inc.

CHANGING MULTIPLE SYSTEM FROM SO₂ TO F-12

QUESTION 690: I have an apartment house job where there are twelve evaporators on one compressor. This compressor is charged with sulphur at the present time, but I would like to convert it over to Freon-12.

I would like to know if the weight of Freon against sulphur is near enough to be able to use the same float with the same calibration. I have changed several domestic jobs over with good results.

ANSWER: I can foresee no difficulty that will arise in changing from SO₂ to F-12 on the apartment house system. Your previous experience should serve to guide you in making the change over. If you have found the SO₂ floats work satisfactorily in household systems when changed over, the same will be true of the multiple system.

I would advise checking the wattage input to the motor before making the change, then check again after changing; compensating for the difference in current drawn by changing the motor pulley.

DEHYDRATING MAJESTIC

QUESTION 691: Will you please advise me how to dehydrate a Majestic hermetic electric refrigerator before charging? I am having a lot of trouble with a stuck up compressor due to moisture.

ANSWER: One of the most satisfactory methods of dehydrating domestic systems is to remove the condensing unit and evaporator and put them in a dehydrating oven held at about 250 degrees while a vacuum is being pumped on the equipment.

If you do not have these facilities, the job can be accomplished by following the method given in the Service Pointer section of the April issue of THE REFRIGERATION SERVICE ENGINEER. Pulling a vacuum on the system can be done with another compressor while the system is being heated.

COOLER CALCULATIONS

QUESTION 692: To verify my estimate, will you please send me calculations on the following set-up? A two-room walk-in cooler, 26 feet long, 16 feet wide, and 9 feet high with a center partition 15 feet from one end. Insulation: 4 in. rock wool; middle wall: 4 in. rock wool. Desired temperature in cooler No. 1 (the smaller): 28°F-32°F. Desired temperature in cooler No. 2 (the larger): 34°F-36°F. Average outside temperature: 94°F-96°F. A separate compressor is used for each room. There are 2—one h.p. condensing units (one for each box). Blower coils: Peerless, no number or name plate on them.

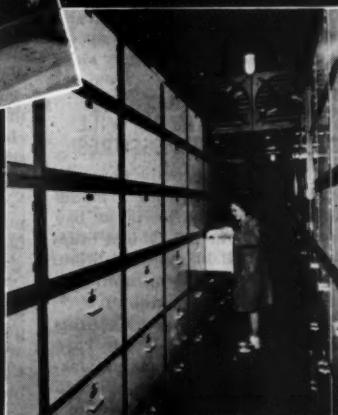
ANSWER: After reading the May issue of THE REFRIGERATION SERVICE ENGINEER, I believe you will see the many factors that must be taken into consideration when figuring the heat load on any installation. You did not give information on the product load as to kind or quantity to be put through the coolers per day. You have not stated whether the cooler is on the ground or in a room where the floor is either over a basement or over another room. If the walls are exposed to the sun, an additional load is imposed. The kind of material used to support the rock wool walls, and how frequently the coolers are opened, also will reflect on the total load.

THERMOBANK

by
KRAMER



Actual THERMOBANK
installation in Locker Storage
Plant of 500 locker capacity.



With the THERMOBANK a zero degree system is just as automatic as a 40° system.

It defrosts itself without the use of electric heaters, brine spray or water spray.

Write for
Bulletin **TV346RS**

KRAMER TRENTON COMPANY

Trenton, New Jersey

The only information I can give you without knowing the above is that the K value of rock wool varies from .30 to .27 Btu. per sq. ft. per inch of thickness per hour per degree t.d. Assuming $\frac{3}{4}$ in. Douglas Fir on the outside and $\frac{3}{4}$ in. Cypress on the inside, the U value for the wall will be:

$$U = \frac{1}{\frac{.75}{.69} + \frac{4}{.8} + \frac{.75}{.67}}$$

$$U = \frac{1}{1.09 + 13.35 + 1.12} = .07$$

When figuring the wall area for No. 1 cooler, the common wall is added with its leakage while the common wall leakage is subtracted from No. 2 because the heat flow is outward to the colder cooler. My estimation of the wall load on No. 1 cooler is 3150 Btu. per hour based on 96° for the walls and ceiling and 80° floor. No. 2 cooler under the same outside temperatures and operating at 34° will have a load of 4100 Btu. per hour. This would indicate that a $\frac{3}{4}$ H.P. air cooled unit running 12 hours per day at 15° refrigerant temperature for No. 1 cooler and a $\frac{3}{4}$ H.P. air cooled unit running 18 hours per day at 20° refrigerant for No. 2 cooler. Two $\frac{1}{2}$ h.p. water cooled units will also do the job by running 15 and 17 hours, respectively. This is for the leakage lead only since no further data was supplied.

GRUNOW EVAPORATORS WILL NOT HOLD HIGHER PRESSURES

QUESTION 693: I have a Grunow domestic Refrigerator Model G70-1933 with a model C compressor. The compressor is so bad that I cannot repair it, but the cabinet evaporator and control are all in good condition. I would like to use a condensing unit with Freon-12 making a remote hookup.

As I have never done a job like this before with a Grunow, I would like to have all the information you can give me on making this change-over. I plan to use a 1/5 or $\frac{1}{4}$ hp. unit in basement, $\frac{1}{4}$ in. liquid line, $\frac{1}{2}$ in. suction line, high side float located on back of cabinet, or on unit. (I am not so sure about this.) I would like to know if this can be done. Also let me know if any other refrigerant control valve can be used with this evaporator.

ANSWER: My first suggestion on the Grunow is to replace the compressor only. The old compressor can be exchanged or rebuilt by any company specializing in rebuilding

hermetic units. I believe you will be more successful by following this method rather than replace the compressor with another type using a different refrigerant.

If you intend replacing the unit, I would suggest you purchase an evaporator as well. Any high side float will operate without difficulty on an evaporator designed for this type of refrigerant control. The more popular evaporators are designed for use with expansion valves or capillary tubes. The float should be located near the evaporator or, if remote, should have the liquid line well insulated or a capillary tube installed at the evaporator entrance to prevent evaporation in the liquid line.

The Grunow used strictly a low pressure evaporator not designed for the higher pressure refrigerants. Freon-12, sulphur dioxide or methylchloride pressures will rupture the evaporator.

FIND THE LEAK!

QUESTION 694: We have a Freon-12 system with four Airtemp radial compressors refrigerating 15 vaults ranging from 0 degrees to 54 degrees. There are also two ceiling type conditioners in the hallway. Two vaults have two sets of evaporators while the others have only one each. Water defrost is used on the system.

No serious trouble has ever developed, but periodically the temperature in all the rooms start to rise. Adding from 50 to 250 pounds of F-12 puts the system back in perfect operation. This would lead one to believe there is a large leak in the system. We have checked and rechecked but only find a very small leak at times.

Would it be possible that the F-12 added becomes "gassified" in time? Water is pumped over the condenser coils while dual fans blow air over the coils.

ANSWER: From an analysis of your letter explaining the system, I am convinced that a sizeable leak is in the system. It may require many hours of checking to find the leak or leaks that will permit such a large quantity of Freon-12 to escape. However it should be the duty of the individual in charge of the equipment to find them and make the necessary repairs. If I were setting out to find the leaks, I would make a thorough check of the connections in the evaporators and tubing while the system is being defrosted. This is the time when the pressure is the greatest. Do not overlook the possibility of leaks in the condensers.

If I understand your letter correctly, evaporative condensers are used. I would suggest the water and fans be turned off while



Avoid Moisture Damage in Over-Seas Packages

Simply put a few small bags of Jay Cee Silica Gel, like the ones above, inside your container . . . wrap or seal tightly . . . and ship over-seas without fear of damage from "in-the-package" moisture. Jay Cee Silica Gel is an ideal drying agent . . . has amazing power to absorb atmospheric moisture. Thus the air inside of containers is kept absolutely dry and delicate metal parts are protected from rust and corrosion.

Jay Cee Silica Gel is also used in pack-

ages of foods, fabrics, chemicals, and other products. Moreover, it has wide application in the air conditioning, refrigeration, and chemical industries. Jay Cee Silica Gel is clear white; passes a rigid section test; meets exacting Government specifications; is strictly a quality product.

JOBBERS WANTED — There are excellent opportunities for jobbers to build profitable business on Jay Cee Silica Gel in a few territories. Write for details.

JOLIET CHEMICALS, LTD., INDUSTRY AVENUE, JOLIET, ILLINOIS



SILICA GEL
A superior dehydrant

the units are running to build up an excessive pressure just prior to making the test for leaks. Water-cooled condensers that leak internally into the water can be checked by use of a halide leak detector held at the outflow from the condenser with the water running. Any Freon-12 mixed with the water will react to the detector as it is liberated on leaving the outflow.

You may find that a small leak during normal operation is a large one when the head pressure or suction pressure is somewhat above normal.

The refrigerant itself is chemically stable, therefore no such condition as you have suggested can occur. There may be leaks of air into the system at some low pressure point that is causing high head pressure.

Let me again repeat the fundamental on which good service is built; "Find the leak and permanently repair it before recharging." You may find it necessary to charge first before sufficient pressure exists to locate the leak.

HIGH PRESSURE BELLows CRACKS

QUESTION 695: I am servicing a 1 hp. Kelvinator refrigerator, using Freon-12 for a cooler room 14 feet by 11 feet by 8½ feet with a Kelvinator conditioned air unit. The temperature is controlled by temperature control which operates a solenoid valve in the liquid line. The compressor is operated by a pressure control set at approximately 35 pounds cut-in and 15 pounds cut-out. My problem is the high pressure cut-out control bellows cracks when refrigerator is about ready to shut off. The compressor starts to slug oil and this opens and closes high side control and cracks the bellows every 6 months. What I want to know is, how can I prevent this chattering. I have checked the pressure on the high side and it is 110 pounds, which is not high. The Ranco control is set for Freon, which is above this pressure. I believe, when room calls for cooling, the temperature control opens the solenoid valve and some liquid comes down suction line and mixes with oil. The unit runs smoothly until back pressure comes below 20 pounds, then it causes oil slugging. I have checked oil level and found it quite low, so it is not a case of too much oil. Would an accumulator in suction line help or a heat interchanger (suction line is ¾ in. line)? Or would it help if I would set differential closer? This may cause machine to short cycle some, after solenoid valve is closed.

ANSWER: I would suggest you change the cut out setting of the switch to stop the unit at a pressure just above the pressure at which it begins to slug oil. It is quite apparent that the pull down in pressure is rapid when the solenoid closes. This rapid reduction in crankcase pressure causes oil foaming. You may find that changing the differential will tend towards short-cycling but no difficulty should result from more frequent running periods.

It will also be advisable to restrict the tube leading to the high pressure cut-out bellows. This can be done by sweating a piece of capillary tube into the larger tube so that the head pressure is transmitted to the bellows more gradually. If the bellows respond to each stroke of the compressor, it would be advisable to check the discharge valves for leak. One leaking valve will soon weaken the metal and cause cracking in one or more flexing points.

I think you will find it is rapid pull down that results in oil pumping. As the refrigerant vapor enters the compressor at the higher suction pressure, it continues to go into solution with the oil. Any quick reduction in pressure on the order of 10 to 15 pounds will cause the oil to foam.

I believe an accumulator would only afford temporary relief because it would continue to trap the oil until more oil would have to be added.

EGG STORAGE CONDITIONS

QUESTION 696: One of my customers who runs a summer hotel requested me to set the controls of an ammonia system, so that they may store eggs for possibly two months. Will you kindly let me know what would be considered the correct temperature for keeping?

ANSWER: There is some variation in the several sources of data on the storage of eggs. One source of information recommends 36 to 42 degrees in a relative humidity of 80 to 85 percent. This set of conditions is stated for "short storage" but the time is not defined. The same source reveals that 12 months is considered the maximum storage time. Another source recommends 30 to 31 degrees at 84 to 86 percent relative humidity.

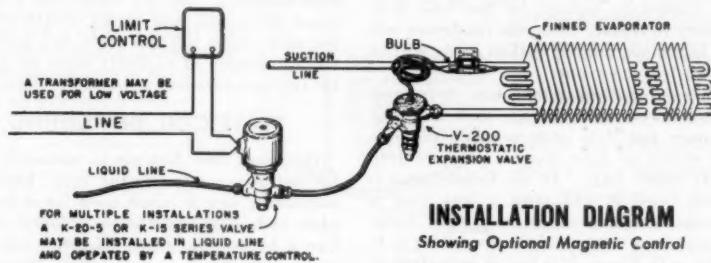
If other products are to be stored in the same cooler, I would suggest 38 to 84 degrees at 84 to 86 percent relative humidity. The humidity conditions is just as important as the temperature to prevent dehydration.

GENERAL CONTROLS

K-20-5 MAGNETIC VALVES

For Efficient Refrigeration

General Controls K-20-5 Magnetic Valve provides magnetic liquid or suction stops for Freon, Methyl Chloride and Sulphur Dioxide. It is a direct acting, single seated needle valve of simple, practical design, constructed of finest materials available. It is especially recommended for "fractional" tonnage installations, where constant tight shut-off is necessary.



INSTALLATION DIAGRAM

Showing Optional Magnetic Control

K-20-5 operates at high pressure, insuring positive control. Coils can be removed while valve is under pressure. Available for A. C. or D. C., any voltage. Maximum operating fluid temperature 240° F.

Write nearest Factory Branch
for Catalog 52B, or direct to:

GENERAL  **CONTROLS**
801 ALLEN AVENUE GLENDALE 1, CALIF.

FACTORY BRANCHES: PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

TESTING SHELL AND TUBE CONDENSER

QUESTION 697: What type of test should be used on a shell and tube condenser after retubing. I find that CO₂ alone at 300 psi. then checking with soap solution is not satisfactory. After this test, I used Freon-12 and CO₂ at 225 psi. and found several more leaks with a halide leak detector. A further check with soap solution revealed a number of very small leaks. Isn't a halide torch supposed to be more sensitive than the soap solution? Would even the smallest leak be a source of future trouble?

ANSWER: In the re-tubing of any shell and tube condenser, it is highly important to clean the grooves in the tube sheet before inserting them in the tube. The tubes should then be rolled in with an expansion roller to create a perfect mechanical joint. There is no set rule or method of performing this operation, therefore, it becomes one of practice by the individual who must do the work. If the shell and tube condenser has been in service for ten to fifteen years, the tubes are often welded in because by the time it is necessary to replace them, the condenser will be in bad shape and more than likely will be replaced by a new one.

I do not fully understand how your pressure tests were made on the shell and tube condenser, but it is quite possible that the gauge would not have shown a pressure drop on very small leaks. If the halide torch is properly used it will show a leak that is much smaller than could be readily found with soap and water. If the condenser is to be used with Freon, it is highly important to stop all leaks rather than continually add gas to keep the refrigerator in operation.

DEFROSTING FIN COILS

QUESTION 698: What is the best way to defrost the finned coils in a locker plant without raising the room temperature too much? These coils are hooked to a one h.p. water cooled condensing unit.

ANSWER: There is very little that can be done toward defrosting a fin coil without installing some defrost method such as water, electricity, or the Kramer Thermobank. Unless the coil is designed for water or electrical defrosting, it is somewhat difficult to arrange. The most satisfactory method would be to use the "Thermobank" equipment and hook-up. This system is fully automatic in defrosting periodically as most electrical methods do.

REMODELING MAJESTIC

QUESTION 699: Will you please advise me how to change over a Majestic electric refrigerator eliminating the high pressure float and installing a metering tube in place. Would you advise using carrene as a refrigerant? How is the length of a metering tube figured for pounds of refrigerant per hour for a given pressure?

ANSWER: I believe you will have better results with the Majestic if you continue to operate it with a high side float. If the original float is defective, you no doubt, can obtain a replacement float of some make that will be satisfactory. The design of the evaporator does not lend itself to capillary tube refrigerant control.

The design of capillary tubes for a given condition involves the application of a formula that takes into consideration the viscosity of the fluid, the pressure difference, the volume of flow, and several other variables that are not too well defined. Selecting the capillary tube is usually done by experiment. An article appeared in March 1943 issue of THE REFRIGERATION SERVICE ENGINEER covering about 60 models and giving length of tube for each. This list will serve as a guide for the application of capillary tubes on domestic refrigerators and beverage coolers.

PLATE COIL DEFROSTING

QUESTION 700: Hot gas is commonly used for defrosting refrigerating coils, but I am wondering why it is not used for defrosting plate such as are used in some locker plants. Can it be used for plate defrosting o.k.?

ANSWER: The use of some defrosting method is not considered practical on plate coils because the water that would drip to the floor or on top of the lockers would freeze causing a mound of ice. It is far more satisfactory to brush the plates then sweep the frost out of the locker room. Brushing the plates should be a regular job of the operator to obtain maximum plate efficiency. The temperature of the plates does not permit an ice formation but rather a flakey snow that is easily removed by brushing.

I see no reason why hot gas defrosting could not be used if the valving of the system is arranged to permit part of the plates to be used as the condenser while the others are still being used as the evaporator.

Of course, defrosting in any manner other than brushing the plates will not overcome the objection of ice forming where the water drips from the plates.

* ACCURACY of CONTROL

is not affected by

Temperature Changes in Surrounding Areas



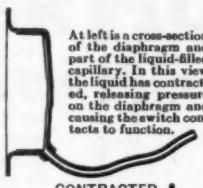
8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid-filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
- ★ 7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

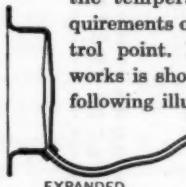
WHITE-RODGERS HYDRAULIC-ACTION REMOTE BULB CONTROLS ARE NOT AFFECTED BY CHANGES IN ROOM TEMPERATURE

When controls must be located under difficult conditions, the remote bulb and capillary of White-Rodgers Hydraulic-Action controls provide the answer. The fluctuating temperature of the area in which the control is located *does not affect* the operation of the control. The design of the sensitive element, together with the expansive force of Hydraulic-Action, makes this possible.

IN MANY TYPES OF APPLICATION THIS HYDRAULIC-ACTION PRINCIPLE GIVES THE ONLY SURE RESULT



CONTRACTED



EXPANDED



Illustration of the White-Rodgers diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.

WHITE-RODGERS ELECTRIC CO.

1202E CASS AVENUE

ST. LOUIS 6, MISSOURI

Controls for Refrigeration • Heating • Air-Conditioning



COLDSPOT SERVICE

(Concluded from page 39)

periment. If another adapter is used to attach a gauge to the gauge port, the head pressure will be observed to drop while purging. It will not necessarily drop to normal for that room temperature because the unit is liable to be excessively warm.

The surest way to regulate the amount of purging is to check the operation of the unit after the first purge to determine if air still remains in the system. Do not purge too much as the charge of refrigerant may be reduced to an insufficient amount for satisfactory operation.

Do not purge units within the guarantee period. Do not purge units without service valves in the top of the receiver. Do not purge Hermetic units.

CORRECT EXPANSION VALVE SETTINGS

Model Unit	Constant Temp. Degree Above Zero F.	Gauge Read. Inch of Vacuum
A11 C, F, G	10 to 8	6 to 7
A11 B, E	8 to 7	7 to 8
A11 D, A	7 to 6	8 to 9
M	6	7
L	6 to 4	7 to 8
K	5 to 3	7½ to 9
J	3 to 2	9 to 10
T, T5	0 to 2	8 to 9
W, W5, W6	0 to 2	8 to 9
Y, Y5, Y6	2 to 4	7 to 8
Z, Z5, Z6	3 to 5	7 to 8
A7, A71	3 to 7	7
B7, BC7	3 to 7	7
B71, BC71	3 to 7	7
C7, C72, C74	3 to 7	7
C75, C76	3 to 7	7
D7, SD7	3 w.	7
E7, E72, E71	3 to 7	7
C78, C77, C78	3 to 7	7
C79	3 to 7	7
18000	3 to 7	7
18100	3 to 7	7
18300 Series	3 to 7	7
18400 Series	3 to 7	7
18500 Series	5 to 6	5 to 7
18600 Series	5 to 6	5 to 7
18700 Series	5 to 6	5 to 7
19200 Series	5 to 6	5 to 7
19400 Series	5 to 6	5 to 7
19500 Series	5 to 6	5 to 7
19600 Series	5 to 6	5 to 7
19800 Series	5 to 6	5 to 7
20000 Series	5 to 6	5 to 7
20200 Series	5 to 6	5 to 7
20400 Series	5 to 6	5 to 7
20500 Series	5 to 6	5 to 7
20600 Series	5 to 6	5 to 7
20800 Series	5 to 6	5 to 7

NAVAL TRAINING SCHOOL CLOSES TRANSFERRED TO NORFOLK

AT SPECIAL exercises last month, attended by high ranking officers of the Navy, the York Naval Training School, maintained and operated for the Navy by York Corporation, York, Pa. under the direction of Frederic B. Kinley, since 1941, graduated its last class and the activities of the school were officially transferred to the Naval Training School at Norfolk, Va.

The school, established five months before Pearl Harbor for the specialized training of naval personnel in the operation, maintenance and repair of refrigeration and air conditioning equipment has trained 1271 men in the four years of its existence. One of the oldest of the Navy's special schools, it included in its enrollment not only naval personnel, but officers and enlisted men of the Marine Corps and Coast Guard, and even of the Army.

Officers of the British Royal Navy and of the Brazilian Navy also attended the school. As the only school thus far to provide instruction in air conditioning, it is unofficially known throughout the fleet as "the University of Air Conditioning."

Originally planned to train submarine petty officers in the complex air conditioning equipment that makes U. S. submarines the world's most efficient, the course was later expanded to cover training in the handling of all types of shipboard refrigeration and air conditioning equipment on all types of vessels, and navy landbased equipment also.

Though the Navy made the assignments to the school, the direction, curriculum, methods and procedures and daily routine of the school were under the jurisdiction of the York Corporation. The method of training and many of the work items used at the school have since been included in the U. S. Navy Standardized Curriculum prepared by the Standards and Curriculum Division Training Section, Bureau of Naval Personnel. When the Navy established the qualifications for machinists mates "R" (refrigeration mechanic), the York school's curriculum and procedures helped measurably in establishing the rate.

W. S. Shipley, chairman of York, made the welcoming address at the exercises followed by an address by Captain T. J. Bay, USN, of the Bureau of Ships. S. E. Lauer, President of York, responded with an expression of what the school has meant to the corporation.

SES

at
the
ool,
by
di-
941,
s of
the

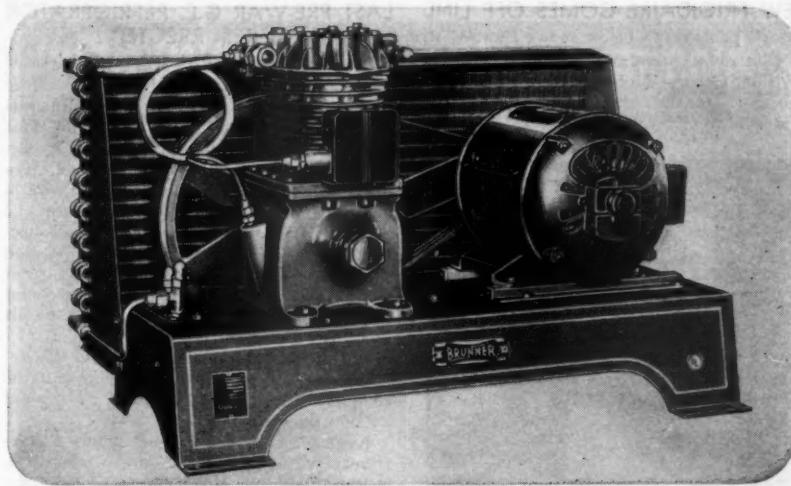
fore
g of
ente-
air
men
the
in-
per-
the
n of

1 of
ool,
in-
ally
ver-

rine
ning
the
ater
ling
and
of
also.
ents
um,
e of
the
ing
the
. S.
by
ision
nel.
ons
me-
and
ing

the
wed
, of
resi-
onra-

ON



YOUR SERVICE must keep them serving!

It may be a long time before there will be enough new BRUNNER Condensing Units for all who want them. Therefore your service must keep them serving as long as possible. In this job, it is Brunner's desire to be of utmost assistance.

When you order Brunner replacement parts through your jobber, please make sure you include in your order all the information necessary to enable the jobber to ship the proper part. Always include the serial and model number of the unit as well as the part number. Most Brunner jobbers carry a complete stock of replacement

parts. If they should be temporarily out of a desired part that is urgently needed, then it may be ordered direct from the factory. But, for quick service, we suggest you order through your jobber first.

Remember that it is our desire to help you keep all Brunner Condensing Units *operating* and we are prepared to assist in any way possible.

BRUNNER MANUFACTURING CO.
UTICA 1, NEW YORK, U.S.A.



NEW FRIGIDAIRE COMES OFF LINE

THE photograph below shows Edward R. Godfrey, General Manager of Frigidaire Division, General Motors Corporation, Dayton, Ohio, to the right, admiring the first household refrigerator manufactured by



Frigidaire since April 30, 1942. Delbert Neal of Dept. 228, Plant No. 2, left, is one of the men who built the first household refrigerator, and next to him is Shirley K. Krueger, eleven-year old daughter of John W. Krueger, General Superintendent of Plant No. 2, while this marks the beginning of peacetime production for Frigidaire, the main objective of the many plants is still building materials for war, which include all propellers used on the B-29 Superfortress. This refrigerator was the first of over 50,000 that will be built during the next three months.

* * *

G.E. POSTWAR REFRIGERATORS TO BE MADE AT ERIE WORKS

GENERAL Electric's postwar refrigerators will be completely manufactured and assembled in the company's Erie Works, H. L. Andrews, vice president in charge of the G-E Appliance and Merchandise Department, announced.

Before the war, production was split. Cabinets were made in Erie while hermetically sealed refrigerating units were made in Schenectady, N. Y. Final assembly was at Erie. Henceforth, Mr. Andrews said, both cabinets and mechanisms will be built at Erie and then assembled for shipment. This change is being made in order to assure better all-around production results, he said.

August, 1945

LAST PRE-WAR G.E. REFRIGERATOR IS RESURRECTED

THE last household electrical refrigerator to be built by General Electric before the company converted to war work was resurrected at Erie August 8 as the first "postwar" model came off the assembly line.

The old machine had been placed in a heavy wooden coffin heavily draped in mourning April 30, 1942, the day when the government stopped all manufacture of electric refrigerators. The event commemorated the first interruption in the manufacture of GE refrigerators since the company went into production in 1927. Exactly 4,523,664 units had been built before it.

During the intervening 89 months, the refrigerator had not been disturbed until the company recently buried it in the ground outside the Erie factory.

August 2, only a few hours before the refrigerator—No. 4,523,665—was unearthed, G-E Refrigerator No. 4,523,666 came off the newly set up production line, was crated and loaded onto a truck for shipment.

Following the new machine came several dozen others, the forerunners of 95,000 refrigerators to be built by the General Electric Company this year.

* * *

AIRCRAFT MANUFACTURER PLANS TO BUILD REFRIGERATORS

THE Rohr Aircraft Corporation, of Chula Vista, Calif., manufacturer of aircraft power plant assemblies, has applied to the War Production Board for authority to manufacture 12,000 refrigerators during the rest of this year as a preliminary step towards reconversion, it was disclosed by Fred Rohr, president of the concern. Rohr plans to reconvert to the production of household electrical appliances. This is Rohr's first step in an extensive reconversion plan under which it will add other household electrical appliances to its line as quickly as possible.

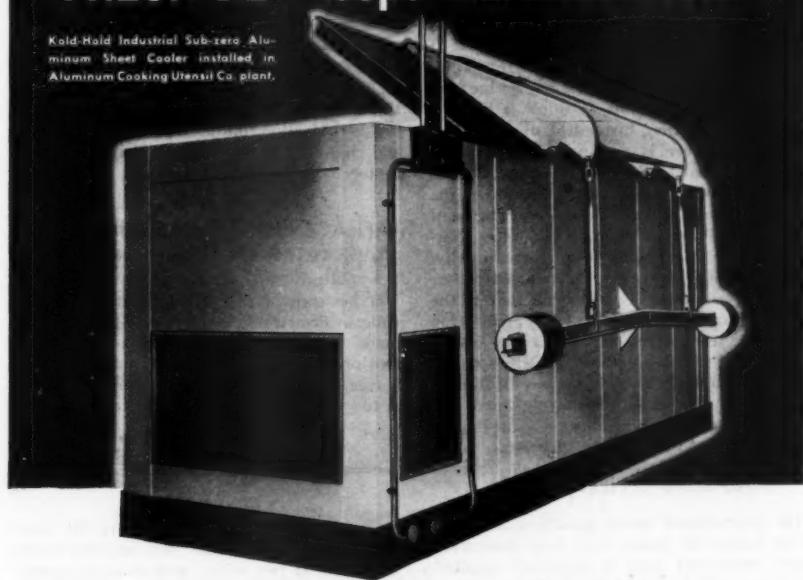
* * *

NEW REFRIGERATION MODELS

TWO new models of commercial refrigerators are now in production at the Westinghouse plant at Springfield, Mass. Made under WPB authorization, in 20 and 30 cubic foot size, they will be available to institutions, commercial and industrial markets having a priority of AA-5 or better.

"FREON-22" keeps aluminum cold...

Kold-Hold Industrial Sub-zero Aluminum Sheet Cooler installed in Aluminum Cooking Utensil Co. plant.



...to turn the heat on the Japs



Heat-treating sheets of aluminum anneals the metal . . . makes it more workable.

But because aluminum alloys—particularly 17S-T and 24S-T—harden quickly at room temperature, the sheets are stored in sub-zero coolers refrigerated with "Freon-22." This makes bending and forming easier and quicker, and results in a better job.

At the New Kensington, Pa., plant of Aluminum Cooking Utensil Co., a subsidiary of The Aluminum Company of America, this job is done by coolers designed and installed by the Kold-Hold Mfg. Co., of Lansing, Mich. They have a capacity of 700 lbs. of heat-treated aluminum sheets used for airplane cowls. Temperature within the coolers can be lowered from

plus 80°F. to minus 20°F. in an hour's time.

"Freon-22" is used exclusively as the cooling agent in these Hi-Low Cabinets, as they are named. "Freon" refrigerants are safe, non-flammable, non-toxic and non-explosive.

Today, refrigeration engineers are using "Freon-22" for hundreds of low-temperature jobs, from freezing foods at -10° or -20°F. to the stratospheric temperatures of

-100° to -150°F. used in testing airplane equipment. Keeping pace with progress, many of these engineers are designing their post-war low-temperature equipment around "Freon-22". Kinetic Chemicals, Inc., Tenth and Market Streets, Wilmington, Del.

IMPORTANT
Increased production facilities NOW enable us to offer "Freon-22" in any quantity for experimental purposes or full-scale operations.



WHY THE MOTOR DOESN'T "JUMP"

THIS interesting question recently came in: "On a pivot-motor base drive, is there any tendency for a motor to jump in case it is driving a machine that is very intermittent in load—a machine in which the load is applied suddenly? In a case of this kind, with the tight side of the belt on the bottom, if there were any jump wouldn't it be in a downward direction, instead of upward?"

Answer: There is an upward and downward movement of the motor in all drives of this type. Where the load is uniform the movement occurs only when starting and stopping. Where the load fluctuates continually the movement occurs continually. This movement, however, is an asset rather than a detriment. It is evident that if the motor were fixed centers, any vibration would be transferred to the driven equipment, or, it would be taken up in the motor bearings. But the fact that the vibration is taken up by the motor in any upward and downward movement is an asset—an important advantage of this type of drive.

No Jump in Heavy Motor

On intermittent loads, pulsating loads, or shock loads, the motor will drop downward when additional load is suddenly applied, but there will be no "jump." There will of course be a *tendency* to jump, but there is no violent jumping because of the mass of the motor. A heavy motor cannot be moved quickly for the same reason that a locomotive cannot be started quickly. The motor absorbs the vibration, that is true, but there is no quick movement because of mass and inertia.

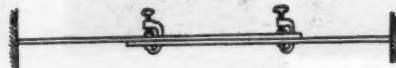
Take for example a suddenly applied load, intermittent in character. A pivoted motor base drive can be used to excellent advantage here. If the motor had to start from a standstill under full load, and then stop again, we would have the worst condition for "jumpiness." However, the motor is usually running at full speed all the time, consequently the load is applied for only an instant and then released.

Bear in mind that the total tension in one of these belts must always be greater than the effective tension. The effective tension is the tension in pounds required to transmit the load. Therefore, if the total tension is greater than the effective tension, it is impossible for the effective tension to lift the motor. This being the case, you may then ask, "What does cause the motor to move

upward and downward?" It is the motor following through the taking up any temporary stretch in the belt. As soon as additional load is applied additional tension is put in the belt which causes the belt to elongate or pull down into the grooves. The motor follows through and takes up the elongation, thus maintaining uniform tension on the belt. As soon as the load is released, the belt recoils to its natural length and hence the motor follows through again. It is the changing of belt length that causes the motor to move up and down.

AN ACCURATE MEASURING KINK

REFRIGERATING engineers are often obliged to do fitting jobs with more or less accuracy. A measurement that often ends in disaster because it is not accurately made involves the exact distance between two objects, which cannot be measured with a rule, cannot be measured with a stick that is too long, or with one that is too short.



An excellent kink for obtaining the exact distance is shown in the accompanying sketch. Use two sticks such as laths or anything else sufficiently stiff. The total length of the two must be somewhat greater than the distance between the walls or objects being measured so that they will overlap as shown. Put them together in contact as indicated and slide outward until the two ends make contact with the desired points. Then clamp or fasten them together as shown, and you have the *exact* distance—as accurate as can be obtained even by use of a micrometer and *more accurate* than most methods.

This method is decidedly better than the cut and try method which is nearly always used and which most people used before they became acquainted with this time-saving and temper-saving kink.

AVCO TAKES OVER CROSLEY

THE radio and household appliance organization at Cincinnati, Ohio, assembled by Powell Crosley, Jr., on August 7 passed into the hands of the Aviation Corp. with the transfer to Crosley of check totalling \$12,000,000 for his personal interest and that held by his family. This deal was announced in THE REFRIGERATION SERVICE ENGINEER in the July issue.



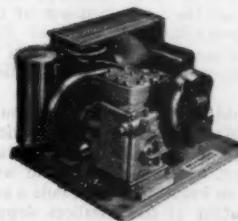
Customer: "What's going on here?"

Salesman: "The Kelvinator Condensing Unit in my beverage cooler keeps drinks ice cold—always!"

30 years of outstanding leadership in engineering, designing and manufacturing of condensing units means greater dependability, economy and performance.

That's the reason, when specifying condensing units, progressive service men always say "Kelvinator!"

Kelvinator distributors and zone offices stock a complete line of refrigeration supplies. See them for your installation material such as tubing, controls, dryers, etc.



Kelvinator
DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT

CONDENSING UNITS
SEALED • OPEN



For Your Home—Remember
Kelvinator Refrigerators, Electric Ranges, Water Heaters
and Home Freezers.

MODEL, MODEL—WHO CAN FIND THE MODEL NUMBER?

Don't let 'em stop you—send a sample or return the entire box.

FINDING difficulty in locating the model numbers or determining the model number when all the numbers have been found, Joe Ammons of Amarillo, Tex., expects to receive a letter from some manufacturer similar to this humorous reply he has prepared as an example.

Dear Mr. Squinch:

We received your order for refrigerator gasket staples but we do not have the model and serial numbers listed that you sent us. Therefore we must hold your order up until we receive more information.

I should have thought that a man of your experience would have known that any numbers as easily found and so clearly read as those you sent could not possibly mean anything. As a matter of fact, those numbers were the wage, height and telephone numbers of assembly inspector No. 8 who had a bad case of fidgets and could only relieve them by stamping numbers promiscuously on everything in sight.

You should know that anything as important as the model numbers cannot be put where just anyone could find them. On most of the older models you will find the numbers stamped with unwashable yellow ink against an orange background on the inside of the left front leg. When we stopped putting legs on our refrigerators we had to find another place, of course, so we stamped them on the back of the food compartment liner and they can be easily found by taking the back and all the insulation out of the box. During production of most of the 1938 models our numbering machine was broken, so we cannot supply parts for those machines.

We would also like to bring to your attention that Mr. I. W. Snork our new vice president in charge of numbers, who replaced our old v.p.i.e.n. after that poor soul was committed to an institution, has made a sweeping reorganization of the numbers department. In order to cut down on existing confusion he has changed all model and serial nos. to conform with a new system he has devised. So even if you find your model numbers they will not match ours unless you order our new catalog No. 893 model AJ14, serial No. cherry 4912, type 11, as revised.

Yours respectfully,
Paul W. Snaffleman
Vice Pres. in charge
straightening out model nos.

HUGE PACIFIC ICEBOX PRESERVES FOOD FOR FLEET

ICEBOX of the Southwest Pacific is the term given the Navy's giant cold storage plant in the Admiralty Islands where enormous amounts of meats, dairy products and other foods are stored to serve the needs of our Pacific fleet.

Although some civilian plants are as large, none is like this one-story sectional building covering several acres which preserves the Navy's "chow." Correct temperatures are maintained by 264 refrigeration units built by Carrier Corporation, Syracuse, New York, which are arranged in double rows outside the food storage rooms, where they are easily tended.

Maximum speed is required in handling perishables in the tropics, and the plant is so located that refrigerated ships dock only 300 yards away. Transfer of food to cold lockers often is done in less than an hour from the time it leaves the ship's storage rooms.

REFRIGERATOR DEALERS ADMIT OPA CHARGES

TWO eastern Oklahoma dealers in second-hand mechanical refrigerators have filed stipulations in Federal Court at Muskogee admitting sales above OPA ceiling prices and consenting to imposition of penalties and injunction decrees.

Don Pizarro, operator of the Motor Inn at Eufaula, admitted selling 18 refrigerators for a total of \$338.50 more than OPA permitted. The agreed penalty is \$507.75.

Fred E. Brown, operator of Brownie's store at Okmulgee, sold one refrigerator above ceiling price and agreed to a \$72.75 judgment, one and one-half times the excess price he charged.

CALIFORNIA REPAIR SHOPS MUST ITEMIZE REPAIR BILLS

A N OPA order, effective July 23, in San Francisco, Calif., requires repair shops to furnish customers with itemized receipts for all work done on household refrigerators, vacuum cleaners or washing machines. The receipt, intended to stop complaints of over-charging, must state the firm's hourly rate for work and the number of hours for which the charge is made.

The Curtain is Rising on the Performance.

YOU CAN'T AFFORD TO MISS!

• PEERLESS OF AMERICA is getting ready to announce new products and designs in Refrigeration and Air Conditioning Heat Exchange Equipment. The show you have been waiting for is scheduled for performance, now that restrictions on manufacture have been eased. We are getting ready to release to you details about our new designs and products. This IS the big show! Pent-up demand in the market will bring on the big crowds!

For this show to be a success we must have your correct mailing address so that we can keep you informed of our new products. To place your name on our mailing list, simply fill out the coupon below and mail today.

PEERLESS of AMERICA, Inc.
MARION, INDIANA, U.S.A.

Yes, I want a front seat for the show when PEERLESS introduces new products and designs. Please place my name on your mailing list for information concerning them.

Title

Name

Company

Street

City and Zone

State

CLIP
and
MAIL
TODAY



PEERLESS OF AMERICA, Inc., Marion, Indiana

ANYWAY—IT RUNS!

HOUSEWIVES of Richmond, Va., are keeping odds and ends handy to help the refrigerator servicemen called in when the refrigerator needs repair. Replacements are hard to get and servicemen have to use their wits to find a substitute. Such was the experience of a Richmond housewife whose refrigerator broke down on the hottest day of the Summer.

This housewife put in a call for the serviceman and he came promptly. After feeling around in the innards of the motor he asked for a metal coat hanger. The coat hanger was produced, twisted into a strange shape and disappeared in the innards of the refrigerator. The machine started to work again. It ran well for a week. The following Sunday it broke down again.

A different serviceman came and this one asked for some old newspapers to wad up and put between the motor and the motor base. This worked, too, and the refrigerator ran happily for another week. Then it developed a horrifying rattle and passed out again.

Again a new serviceman answered the call promptly, and after feeling the motor sympathetically, scoffed at the newspapers and asked for a stick of wood about 12 inches long. This also disappeared under the refrigerator and one more it revived and sang quietly and happily as it went about its work.

Soon comes another Sunday and the good housewife has her fingers crossed. Will it break down again and if so what will the resourceful repair man need to fix it? A packing of chewing gum, perhaps, or a golf club.

SACRAMENTO SCHOOLS OFFER REFRIGERATION TRAINING

THE shortage of experienced repairmen for mechanical refrigerators has prompted the public schools of Sacramento, Calif., to conduct courses in repair work.

Classes in refrigeration training have been under way since September 1944. At present two classes are active and the course will be continued as a part of the summer session and on through the fall months. One class meets Monday and Thursday from 7:00 to 9:00 p.m., and the other meets Tuesday and Thursday evenings at the same time.

Instructors are Owen Cooper recently with Henshaw Supply Co., and Edgar E. Sprow of the Household Supply Co. Gerard A.

Castleman coordinates apprentice training for the city schools, and Carl W. Anderson of Pacific Gas & Electric Co., who is secretary of the Northern California Electrical Association.

Classes for the most part are made up of adults who want to work full time in this field, and plumbers who are interested in commercial refrigeration rather than the domestic side. All students, it is said, who have devoted more than 150 hours to actual shop practice in the refrigeration training program, have no difficulty landing jobs with service concerns.

The course of study was developed by the National Refrigeration Service Manpower Committee and covers a total of 200 hours of class room and shop work divided into three parts: general, domestic and commercial.

FOUNTAIN MANUFACTURERS ORGANIZE

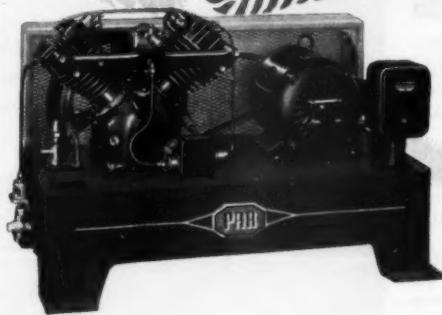
CARL J. PALMER, a veteran of the fountain industry, has been appointed executive secretary of the newly organized Soda Fountain Manufacturers Association, with headquarters at 111 West Washington Street, Chicago. Mr. Palmer's experience in the industry includes executive positions with the Liquid Carbonic Corporation and Bastian-Blessing Company, both of Chicago.



CARL J. PALMER

The association, whose membership is open to all fountain manufacturers whether regional or national, has set up the following program:

1. Compile and disseminate statistics about the fountain and allied fields.
2. Promote sales and use of soda fountains in wider and better markets.
3. Improve standards of manufacture.
4. Collect and disseminate information regarding health, sanitation, and other requirements or restrictions of federal, state or local governments affecting manufacture, installation or operation of soda fountains.
5. Help fountain operators improve the care and operation of their equipment and assist in the conduct of the retail soda fountain business.



YOUR Par Jobber has Complete details on the Par line of Condensing Equipment. See him for full information or write for Par catalogue R-96 and supplement R-96A.

PAR—Condensing Unit Line sold exclusively through Franchised Refrigeration Supply Jobbers!

PAR
Lynch
DIVISION

. . . By Comparison — You'll Buy **PAR**
Manufacturing Corporation, Defiance, Ohio
U. S. A.

DENVER JOBBER ENLARGES STORE PROVIDES INCREASED FACILITIES

BACK in 1934 when Harold McCombs started to sell refrigeration parts and supplies, he had a good idea of the type of a wholesale refrigeration parts supply store he would like to set up.

Recently some of his ideas were incorporated in the newly remodelled and enlarged store of the McCombs Refrigeration Supply Co. at 1524-26 Fifteenth St., Denver 17, Colo. Enjoying a continuous growth since the establishment of his business, McCombs is optimistic about postwar business in the territory served by his company. The enlargement of his store and the expansion of facilities have been carried out at this time in anticipation of this future business.

"The present store is designed to provide expedient and satisfactory service to the refrigeration engineer from a well stocked supply, and we also consider a well managed and attractive store essential to the interests of the manufacturers we represent," stated Mr. McCombs.

A branch store is also maintained at Pueblo, Colo., with Donald Wallace as manager. To provide direct service in outlying territories, W. T. Farrow is travelling representative, covering the entire state of New Mexico.



W. T. Farrow

The McCombs organization serves the territory comprising Colorado, Wyoming, New Mexico, and the western borders of Nebraska and Kansas.

McCombs is service minded and active in association work. He is president of the National Refrigeration Supply Jobbers Association and a charter member of Mile High Chapter, R.S.E.S.

1. Harold McCombs and his organization, pictured in the recently remodelled and enlarged store. Left to right: Lee Martin, stenographer; W. M. Bowman, counter salesman; Frank Walters, shipping clerk; Mr. McCombs; R. C. Kimmel, purchasing agent and office manager; LeRoy McCutchan, receiving clerk and stockman; J. A. Marshall, bookkeeper; Helen Geisler, stenographer.

2. Another view of the store. Stock bins extend back 25 feet. Display tables will be installed later in front of the counters to display the smaller accessory items.

3. A view of the office.

4. McCombs Refrigeration Supply Co., Denver, Colo., occupies this two-story, 50x100 foot building including basement.





What
CONTROLS
Shall We
Use?



The **RIGHT** Control for **EACH**
Application gives **BEST** Results!

Milk, Beverage, Water Coolers . . .	<i>L480B Temperature Control</i>
Reach-In Meat Cases	<i>Polartron System of Automatic Defrosting W90 Temperature Control plus P420B Pressure Control</i>
Soda Fountains } Ice Cream Cabinets }	<i>P420B Pressure Control or L480B Temperature Control</i>
Walk-In Meat Boxes	<i>T4420 Frigistat plus W35A Relay plus P421B Pressure Control</i>
Locker Storage Units	<i>T414A Temperature Control plus L413A or P421B Pressure Control</i>
Vegetable Cases	<i>W90A Temperature Control plus P420B Pressure Control</i>
Home Freezers Low Temperature Cabinets }	<i>L480B Temperature Control</i>

Other M-H Controls are readily available for all types of applications. Minneapolis-Honeywell Regulator Company, 2934 Fourth Avenue South, Minneapolis 8, Minnesota. Branches and distributing offices in all principal cities.

MINNEAPOLIS
Honeywell
CONTROL SYSTEMS

The POLARTRON SYSTEM of FROST FREE REFRIGERATION

Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.



THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

ILLINOIS STATE ASSOCIATION PLANS FALL MEETING

THE annual business and educational meeting of the Illinois State Association R.S.E.S. will be in Bloomington, Ill., on October 20 and 21. Corn Belt Chapter of Bloomington promises a very fine program of speakers whose topics will be of interest to all refrigeration service engineers.

Plans are completed for the meeting to be held at the Hotel Rogers. The committee in cooperation with the state association officers is carefully selecting topics on refrigeration that will be of decided interest to the refrigeration service industry.

Bloomington officials and the Chamber of Commerce are cooperating with the local Chapter officers to make the meeting pleasant by living up to the reputation the city has for hospitality.

CLEVELAND CHAPTER PICNIC

THE Cleveland Chapter held its annual picnic on July 15, 1945, at the Fell Lake Park, about 15 miles south of Cleveland. All had a good time, playing baseball, swimming and dancing. Some old-timers took advantage of the day off to just sit and rest and visit.

Ice cream and soft drinks were served free to everyone. A total of about 100 were present. Thanks to the Entertainment Chairman Glenn Keller for the fine arrangements and selection of presents which were given away for the winners of the different games and races.

Success of the picnic plans is attributed to the efforts of those chosen for committee work. The spirit of good fellowship existing among the Chapter members made the outing most pleasant.

R.S.E.S. Chapter Notes

SAN DIEGO CHAPTER

San Diego, Calif., July 19—The meeting was held in the Anderson Building meeting rooms and was well attended. One application for membership was read and three more were approved. Because of the educational program to follow, the business meeting was cut short.

E. T. Howard of General Controls spoke briefly on post-war possibilities and policies and then introduced his chief engineer, V. J. Matteson, who spoke at length on refrigeration control devices and answered questions in an open discussion at the close of his talk.

Sandwiches and drinks were served to all present by the evening's entertainment committee.

MIAMI CHAPTER

Miami, Fla., July 12—Seven names were added to the original fifty-eight men who petitioned for a charter on June 28, 1945. Enthusiasm is still "running high" among the members and Greater Miami Chapter promises to be a very live organization. At the recent meeting, two more officers were elected to help the present officers. The officers are: J. H. Colvin, *Second Vice President* and M. D. Patterson, *Sergeant-at-Arms*.

MULTNOMAH CHAPTER

Portland, Ore., July 6—The petition for charter for this new chapter has been closed with twenty-three new members and seven members-at-large signing. The chapter is composed largely of men in Portland but others representing the following communities are also members: Milwaukie, Swan Island, and Lake Grove—all in Oregon, and Vancouver, Washington.

ASTRAND DIVISION 202

Every refrigeration man needs this new catalog!

Designers, engineers, service-men, purchasing agents—every key department head in the refrigeration field—should have this new Weatherhead Refrigeration Catalog. It gives you at a glance detailed, illustrated data on the multitude of *improved* refrigeration parts Weatherhead engineers have designed and

created for original installations and replacement work. Write or call one of our branch offices for your copy of this 40-page catalog—It's free!

Six important sections

*Refrigeration Valves • Dehydrators
Strainers • Manifold Assemblies
Accessories • Fittings*



Look
Ahead
with



Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO
Plants: Cleveland, Columbia City, Ind., Warsaw, Ind., Los Angeles
Canada—St. Thomas, Ontario

BRANCH OFFICES: NEW YORK • PHILADELPHIA • DETROIT • CHICAGO • ST. LOUIS • LOS ANGELES

LOS ANGELES CHAPTER

Los Angeles, Calif., July 25—The meeting consisted of a dinner for members and their guests on a reservation basis. After the dinner, Bill Irving, manufacturers of plastics, showed the various finished products and had samples for those present. Motion pictures were also shown to complete the evening's program.

DES MOINES CHAPTER

Des Moines, Iowa, July 15—The members met at McHenry Park on July 15 for a business meeting and picnic. Norbert Daman was accepted as a new member. The officers elected for the next year are: H. R. Brewster, President; N. G. Daman, Secretary-Treasurer; E. Snyder, Sergeant-at-Arms; B. F. Wood, Educational Chairman.

Plans for a membership drive were made with a "Loser-feed-the-winner" penalty. Team Number one includes Ray Jones, B. F. Wood, and Norbert Daman. Team Number two is made up of Earl Snyder, Charles Searcy, and H. R. Brewster.

PITTSBURGH CHAPTER

Pittsburgh, Pa., June 29—At this regular meeting, Dr. Edward S. Ross of the Sun Oil Company, gave a very interesting talk on the new developments in lubricants for refrigeration compressors. Dr. Ross started his talk with a resume of some of the problems encountered by the Oil Companies in the early days of refrigeration. In those days many of the operation troubles were blamed on oils and a careful study of these troubles in many cases were traced to other causes. As the design and service engineers became more familiar with this then fairly new equipment, the oil companies were working hand in hand with the manufacturers to supply an oil that would meet their requirements.

During the open discussion a number of questions were asked by an interested audience. Among these were: oil requirement over amount theoretically needed, due to carry over with Freon; location of traps in system because of high solubility with Freon. Another question was the re-use of oil after purification. Dr. Ross talked in the Service Engineer's language as was shown by the number of questions asked by many of the members present. In the usual "after the meeting discussion" the consensus of opinion was that the members heard a very interesting talk by a man who knew and appreciated their problems.

The regular business of the evening was then taken up. The new officers were introduced and installed and took over their duties. The officers elect are: Harry A. Bortz, President; George A. Rauch, Vice Presi-

dent; Charles A. Frost, Secretary; Andrew A. Hoerner, Treasurer; Howard Stehle, Educational Chairman. Board of Directors are: Herbert A. Biber, E. Vernon Black, J. G. Gaus, and Joseph Hibbs.

The suggestion of having a picnic was discussed and it was decided to learn where and when it could be held, then send a post card questionnaire to the membership.

Service Improvement Advisory Committee was discussed at length and the replies will be handled by Mr. Bortz. The official register showed twenty-five members and visitors present.

HOUSTON CHAPTER

Houston, Texas, July 10—The meeting was called to order by president Timmerman who discussed the proposed constitution and by-laws. Further action was delayed until the board of directors act on them and submit them to the members.

A letter from B. B. Hursh, formerly of Houston, and now located in Wilmington, Illinois, was read to the members. Mr. Hursh was active in organizing the Houston Chapter.

CORPUS CHRISTI CHAPTER

Corpus Christi, Texas, July 11—The meeting was held in the auditorium of the Central Power and Light Company. In the absence of the president, E. D. Gideon presided. The members were informed that their petition for charter has been approved.

Official approval for the change in name from Corpus Christi Refrigeration Society to the Corpus Christi Chapter of R.S.E.S. was voted on and passed.

The meeting was then opened for discussion and several members described new methods on service work that they had learned in their daily activity. One interesting method of removing a tight flywheel by applying Casite then heating was advanced by Messers Edwards and Dennis. They have found that tight flywheels can be readily removed in this manner.

BOSTON CHAPTER

Boston, Mass., June 12—The meeting was held at the Hotel Manger where L. W. Pierce gave a report of the meeting of the New England State Chapters held at Shurbridge, Mass. Three new applications were received and referred to the investigating committee.

William Paulin, educational chairman, then introduced C. E. Howell who gave a very interesting and instructive talk on the Westinghouse Precipitron as applied to refrigeration and air conditioning applications. Twenty-five members were present to hear Mr. Howell.

Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES



The Reason for
LOGAN
ACCURACY



Accurate work comes from Logan Lathes because accurate work goes into building them. Typical of maximum tolerances allowed are Bed ways within .0005" of parallelism, and headstock bearing faces held to an accuracy of .0005". To maintain such accuracy in lathe after lathe, one of every seven men building Logan Lathes is an inspector, skilled in the use of precision instruments such as Comparators, Johannson Blocks, Sine Bars, and the most accurate of gauges. Using this precision equipment, Logan inspectors check individual parts, sub-assemblies, and completed machines. They make certain, in short, that every Logan Lathe will work accurately because every part of that lathe fits accurately. This Logan stress on inspection, though costly, is also the wisest economy. Lathes which pass such rigid inspection make friends of the men who use them. Ask your Logan Lathe dealer, or write for full information on all Logan Lathes.

SPECIFICATIONS common to all Logan Lathes: Swing over bed, 10"; Bed width across ways, 6-15/16"; Bed length, 43 1/2"; Size of hole through spindle, 25/32"; Spindle nose diameter and threads per inch, 1 1/2"-8; Spindle speeds . . 30 to 1450 r.p.m.; Size of motor . . 1/2 or 1/2 h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, 2 flat ways.

LOGAN ENGINEERING CO.
CHICAGO 30, ILLINOIS

D-2

DAYTON CHAPTER

Dayton, Ohio, July 12—The meeting was held at Allied Parts with a very good attendance. The business portion of the meeting included making final arrangements for the picnic. The applications of Ronald R. Myers, Louis Bender and Clarence C. Greene were received and they were accepted as members.

The educational portion of the meeting was turned over to Mr. Moore and Mr. Plouff, representatives of the Ansul Chemical Company. They showed pictures of effects of methyl chloride on aluminum, and the formation of wax in lubrication oil in low temperature refrigeration. The pictures and discussion that accompanied them were very interesting and informative.

BIRMINGHAM CHAPTER

Birmingham, Ala., June 6—This regular meeting was held at the Moulton Hotel. Dinner was served before the business meeting was opened by president W. C. Kent. The accounts and supplies of the former Vulcan Chapter were transferred to the Birmingham Chapter as the former members are now part of this active chapter.

July 5—At this meeting, two new members were accepted on the recommendation of the membership committee. By consent of Mrs. Robert Gennett, the chapter charter is to be displayed in a suitable frame at the Refrigeration Supplies Distributor.

E. V. Oakwood, educational chairman, offered a program of special educational lectures to be presented at following meetings.

MONUMENTAL CHAPTER

Baltimore, Md., June 13—At this meeting, copies of the constitution and by-laws were distributed to the members. Arrangements were made to have the charter framed. Some discussion and answers to questions from the Service Improvements Advisory Committee were given by those present.

Mr. Boone of the Minneapolis-Honeywell Company spoke on and showed movies of electronics as applied to the CI Automatic Pilot used on aircraft.

LOUISIANA CHAPTER

Baton Rouge, La., July 8—The meeting was held at O. J. Crow's place of business with a good attendance. After president Crow opened the meeting several problems of everyday service work were brought up. The discussion on this was an interesting one and every one present benefited by it greatly. The membership decided to have a special drive to get new members into the chapter. Those present discussed plans for the chapter to have a supper in the near future.

MADISON CHAPTER

Madison, Wis., June 14—This was a dinner meeting, and one of the best attended meetings that we have had recently. There were several visitors present. Applications for membership were accepted from five servicemen. After the meal an attendance prize donated by the local jobbers was awarded to Clarence Buschkopf.

Dr. Moberly, a safety engineer, was the speaker of the evening. He gave a few stories of interesting freak accidents, and some serious talk on safety and accident prevention.

July 12—At the last several meetings there was some discussion relative to increasing the local chapter dues. At this meeting it was voted to increase the dues to \$10 per year. The increase is to become effective at the beginning of the 1946-47 fiscal year.

Electron of officers was held with the following results: President, Walter Krause; Vice-president, Lee Miles; Recording Secretary, Don McNearney; Financial Secretary, Fred Barney; Treasurer, Walter Anlauf; Sergeant-at-Arms, Wm Meyer.

Plans for the annual picnic were discussed. The time and place had already been set—Burrows Park at Madison on Sunday, August 12. It was decided to have a lunch furnished by the chapter. Fred Schara was appointed chairman of the picnic committee and instructed to select as many assistants as he thought necessary.

ST. LOUIS CHAPTER

St. Louis, Mo., June 19—The meeting was held at Herman's Place, 4110 Gravois, conducted by president Adolph Braun. It was decided to designate the third Tuesday in each month for R.S.E.S. meetings.

The program for the evening was furnished by the Alco Valve Company. Frank McDougal pinch-hitting as speaker for Dick Dawson, discussed refrigerant controls; his talk being illustrated with slides.

Following the talk, there was a drawing for attendance prizes which had been contributed through the courtesy of the N. O. Nelson Co. and the Chapter. Meeting was adjourned with 38 in attendance.

KANSAS CITY CHAPTER

Kansas City, Mo., June 6—On the opening of the meeting, applications of John C. Booi and Darrel W. Macey were accepted. Cecil R. Visger then reported on the progress made by the Service Improvements Advisory Committee. Mr. Visger's report was followed by additional suggestions.

The educational feature was conducted by G. E. Tribble, a chapter member, whose topic was "Effect of Ultra-Violet Lamps in Pres-



REFRIGERATION PARTS

Rebuilding and Exchange

- COMPRESSORS
- CONDENSERS
- WATER VALVES
- CONTROLS
- EVAPORATORS
- FLOAT VALVES

UNCONDITIONALLY
GUARANTEED

*Send Today for
This Useful Catalog*

Fully illustrated catalog packed full with valuable information and prices sent upon request on your company letterhead.

REFRIGERATION MAINTENANCE CORPORATION
321 EAST GRAND AVENUE • CHICAGO II, ILLINOIS

HOME-PROVEN
BY THOUSANDS

Many QUICFREZ Farm Locker Plants have
already been in use for over 6 years.
Write for literature.

SANITARY REFRIGERATOR CO.
Fond du Lac, Wisconsin

SANITARY
Quicfrez

ervation of Foods." Mr. Tribble made demonstrations on how ultra-violet rays can penetrate opaque shields. This demonstration was followed by locating and displaying bacteria on several meat samples. It was pointed out that corn-fed beef could be distinguished from grass-fed beef by the fluorescent qualities displayed under mercury-vapor spotlight designed by Mr. Tribble.

Refreshments were served by the Ladies Auxiliary at the close of the meeting.

TWIN CITIES CHAPTER

Minneapolis, Minn., July 10—Several committee reports were made, among them being the membership committee who recommended junior membership for H. Saifred Johnson and active membership for Algot Anderson; both being accepted.

The waiver of a portion of the city ordinance for the benefit of a firm doing business in Minneapolis was cited. The chapter prepared a resolution protesting to the City Council their action. It was also decided to write to the State's Attorney for an opinion on the legality of the ordinance.

Following this regular business, Professor Lund of the University of Minnesota discussed various insulations used in refrigeration work.

READING CHAPTER

Reading, Pa., July 5—The following officers were elected for the year ending June 30, 1946: Harold F. Baisch, President; James Bowers, Vice-President; Joseph A. Heltzinger, Secretary; Stanley C. Mathias, Treasurer.

Ladies Auxiliary

KANSAS CITY CHAPTER AUXILIARY

Kansas City, Mo., June 6—Meeting was called to order by the President, Mrs. L. A. Mendenhall at Hotel Bellerrive, 214 E. Armour. Mrs. Sullivan expressed the thanks of her husband, Albert L. Sullivan, for the birthday card sent him. Birthday cards were signed for George Rostock, S. A. Leitner, and L. H. Roberts. Meeting was adjourned so all could attend a picture shown by the R.S.E.S.

NIAGARA FRONTIER AUXILIARY

Buffalo, N. Y., June 9—An extra meeting was held at the home of Mrs. J. Bush of Lockport, N. Y. The men held a board of directors meeting at the same time and place.

Mrs. Davis announced plans for renting a meeting room in the fall. A discussion fol-

lowed as to ways of making money enough to maintain the meeting room. Making a quilt to be raffled and having another blanket club were considered.

Plans for social activities next season will be made by Mrs. Davis who was elected social chairman. She will select a committee to work with her.

Mrs. Schintzius, a guest at this meeting, filled in her application for membership.

* * *

REMA OBSERVES TENTH ANNIVERSARY

ORGANIZED by less than dozen companies in 1935 and growing steadily to where it now includes 80 manufacturers of all types of mechanical refrigeration and air conditioning parts, complete units and complete systems, the Refrigeration Equipment Manufacturers Association observed its 10th anniversary August 15 with a summer meeting of the board of directors in Marinette, Wis. The directors were guests of F. J. Hood, newly elected REMA president, whose company is situated in the Northern Wisconsin city.

While the ten years which have elapsed since REMA was formed have marked some of the most important developments in the history of mechanical refrigeration and air conditioning, the next decade, in the opinion of association officials, will see even more far-reaching progress in both fields.

The Refrigeration Equipment Manufacturers Association was formed at a meeting in Detroit, held concurrently with the second annual meeting of the Refrigeration Service Engineers Society. REMA's first name was the Refrigeration and Parts Manufacturers Association, and its first president was J. D. Colyer who remained in office for three years. He was followed by J. S. Forbes who was president for two years, during which the name was changed to its present form, and the first REMA all-industry show was held in Chicago. Mr. Forbes, who continues to take active part in REMA activities, also was the first vice-president, and other "first" officers were H. V. Higley, treasurer, and Earl A. Vallee, secretary.

On the same days REMA was being organized in 1935, the association now known as the National Refrigeration Supply Jobbers Association, Inc., was in the process of formation at a separate meeting in Detroit. This organization, too, has made rapid progress and today stands as the leader in its field.

DAY & NIGHT WATER COOLERS AVAILABLE WITHOUT PRIORITY



Good news! Glass filler coolers for cafeterias; bubbler coolers for offices, stores, factories; and commercial coolers for all applications . . . available now without priority. Complete models and sizes.



COOLER DIVISION DAY & NIGHT MFG. CO.

MONROVIA • CALIFORNIA

FACTORY REPRESENTATIVES

NEW YORK

A. C. Homeyer, 822 Bdwy.

CHICAGO

Mark Shantz, 165 Wash Blvd.

ST. LOUIS

ATLANTA, GA.

R. H. Spangler, 3331 Market St. • J. E. Parker, 281 Peachtree N.E.

WRITE FOR LATEST DATA



"FARTHEST NORTH" in Modern Refrigeration

Write for catalogs, engineering assistance, or a representative to call.

DOLE REFRIGERATING CO., 5910 N. PULASKI RD., CHICAGO 30, ILL.
N. Y. BRANCH, 103 PARK AVE., NEW YORK 17, N. Y.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

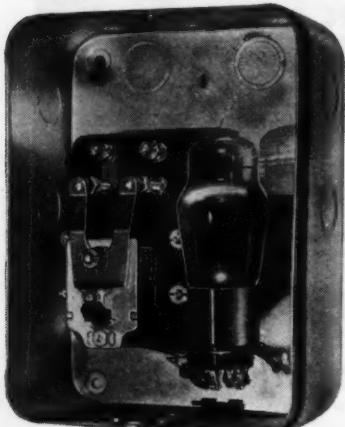
Electronic Relay Controls 30 Ampere Outputs

THE super sensitive Electronic relay, manufactured by Precision Thermometer & Instrument Company, is a grid controlled, half-wave rectifier that combines in one compact unit all the functions of a series of relays such as are commonly employed for control of outputs up to 30 amperes, 110 to 120 volts, 50-60 cycle, A.C. up to 30-amperes are controlled with only 100 microamperes in the instrument circuit. No audible A.C. hum. Low-resistance, "fine" silver contacts are easily adjusted or replaced. Coils are precision wound, impregnated and baked, and must withstand a breakdown

test far in excess of rated capacity. Standard vacuum tube amplification, and simplicity of design and wiring, assure maximum service life.

Originally developed for use with "Princo" Mercurial Thermostats and Thermoregulators, these relays are used in a wide variety of industrial and laboratory control applications with such instruments as contact microammeters, pressurestats, photoelectric cells and similar apparatus. The 30 ampere relay is adapted to control of the more complicated refrigeration systems where more than one motor is dependent on the main thermostatic control. "Princo" Resonated relays for outputs up to 15 amperes, and "Princo" Magnetic Relays for outputs up to 2 amperes are described, together with the 30 Ampere Electronic Relay, in the new Bulletin TR.

Copies available on request to the manufacturer, Precision Thermometer & Instrument Company, 1434 Brandywine St., Philadelphia, Pa.



Electronic Relay made by Precision Thermometer & Instrument Co.

August, 1945

80

New Home Freezers Announced by Westinghouse

UPRIGHT home freezers for city and farm use with front-opening doors and sectional inner doors for easy food storage and removal, will be manufactured by the Westinghouse Electric Appliance Division shortly after civilian production of electric appliances is resumed, T. J. Newcomb, sales manager, announced.

"This upright design, in contrast to the horizontal models now commonly in use in food stores, will make the new home freezer the companion piece to the household electric refrigerator in size and finish and will provide the same reach-in convenience of the refrigerator," said Mr. Newcomb.

"Since the cabinet will occupy no more floor space than a refrigerator of comparable size," he continued, "it can be located in the most convenient place in the home."

The Westinghouse home freezer will be produced in three models, starting with a six cubic foot size, to meet both urban and farm requirements. The two functions of

Below: Transferring steak from freezing section to storage compartment of new Westinghouse home freezer.



THE REFRIGERATION



• It's easy — and profitable too — to service motor-starting capacitors the "Aerovox Jiffy Way". Especially now with those Aerovox Universal Replacements. A minimum number of types takes care of a maximum of different types of refrigerators. Here's how:

UNIVERSAL REPLACEMENTS

Aerovox offers 22 Universal types for 110-volt, 6 types for 220-volt.

These 28 universal types can take care of upwards of 90% of all motor-starting capacitor replacements.

Handy Aerovox Conversion Chart indicates Universal Replacement equivalents for any previously available type.

• Ask Your Jobber!



SERVICE ENGINEER

81

WHEN YOUR CALLS FOR SERVICE ARE

on Meter-Misers the owner depends on you to have the refrigerant

Don't be stopped from servicing Meter-Misers for lack of the refrigerant. The highly successful use of a replacement refrigerant will enable you to service Meter-Misers at a profit. Use . . .

HERVEEN

the IDEAL REPLACEMENT GAS

Your responsibility to your customers ranks high on the list of necessities for good health. Your success depends on how well you carry out that responsibility to—not one but all those who call on you for service. Get your supply of HERVEEN and be prepared for future calls.

See your jobber or write direct to

MODERN GAS CO., Inc.
Manufacturers & Refiners
1084 BEDFORD AVE.
Brooklyn 5, **New York**

August, 1945

freezing and storing foods will be done separately in all models.

"Sectional inner doors and shelves," Mr. Newcomb pointed out, "make it possible to select specific foods from an individual section of the cabinet without disturbing food arrangements or temperatures in other sections. Zero temperature is maintained in storage compartments. On the freezing sur-

faces, temperatures range from minus 10° F. to minus 20° F.

"Defrosting," Mr. Newcomb said, "will be as easy, but far less frequent than defrosting an electric refrigerator and it will not be necessary to remove foods from the storage sections. Actual home tests of the new home freezers show that users open their cabinets on an average of only once or twice a day, or

less in a month than the average domestic refrigerator is opened every day and defrosting therefore need be done only once every six to nine months."

The new upright home freezer will, like the domestic electric refrigerator, have a hermetically sealed system. Thus, service will be simplified to a point comparable to household refrigerator servicing.

PENN NAMES NEW BRANCH MANAGERS

THE appointment of three new branch managers and the opening of a new branch office in Milwaukee, Wisc., has been announced by R. H. Luscombe, sales manager of Penn Electric Switch Co., Goshen, Ind.



E. M. SMITH G. O. SANDERS E. S. KYLE



E. M. Smith, formerly manager of the Company's Detroit office, has been transferred to the home office and effective July 1, will be manager of the Goshen factory sales branch covering northern Indiana, part of western Ohio and southwestern Michigan.

G. Orr Sanders was employed recently to succeed Mr. Smith as manager of Penn's Detroit office. An experienced sales engineer, Sanders was formerly manager of the Capitolaire Division of U. S. Radiator Corp. in Detroit and consequently is well-known in the territory. Previously, he was connected with Mayflower Air Conditioners as a factory representative.

E. S. Kyle has been engaged by Penn to manage the Company's new branch office which was established on July 15, at 1141 N. Van Buren St., Milwaukee, Wisc. Before joining Penn, Kyle was in the experimental department of Cleaver-Brooks Co., in Milwaukee. In addition to his wide engineering experience, Kyle formerly was engaged in selling electrical equipment for 10 years in the Milwaukee area as a Manufacturer's Agent.

In making the above announcement, Mr. Luscombe stated that this is but another move on the company's part in expanding its facilities and service to its customers for the postwar period. Penn manufactures automatic controls for heating, refrigeration, pump and air compressor service as well as safety controls for internal combustion engines.

ALCO VALVE ELECTS MAGUIRE NEW PRESIDENT

THE election of Russell Maguire as President and General Manager of the Alco Valve Company, St. Louis, Mo., manufacturers of Automatic Control Devices for air conditioning and refrigeration equipment has been announced. Mr. Maguire succeeds Arthur B. Schellenberg, whose resignation became effective July 31. Mr. Maguire, who owns control of the company, has been active in the management since 1937. During this time Alco has expanded from less than 100 to over 500 employees and made a major contribution to the war effort. It has recently received the second star for its Army and Navy "E" Pennant.

Mr. Maguire is recognized as being among the most outstanding industrial leaders in the country. He is best known as president of Maguire Industries, Inc., of New York, first famous as the sole manufacturer of the world-renowned "Tommy" Gun, now among the top producers in the electronic industry. Among his other activities are numbered Meisener Manufacturing Company of Mount Carmel, Ill., producers of fine radios and phonographs, Thordarson Electric Manufacturing Company of Chicago, builders of transformers for fifty years, Columbia Machine Works of New York, manufacturers of centrifuges and dairy equipment, and Micro-Ferrocarril Company of Stamford, Conn., engaged in the field of powdered metal parts for electronics and mechanical uses. He is

**EFFICIENT...
ECONOMICAL**



**TYPE
WP**
PRESSURE
ACTUATED
REGULATING
VALVES

Individually tested for efficient, economical operation. WP regulating valves may be mounted in any position and will give lasting, trouble-free performance. Brass body, two ply power bellows and corrosion resistant materials for all internal parts. They are designed not only to start and stop the flow of water but also to feed the economic amount of cooling water to secure the proper condensing pressure without waste. The water flow increases and decreases with the rise and fall of actuating pressure.

WP regulating valves are available in $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT sizes and other valves of other types are available in sizes ranging from $\frac{3}{8}$ " to 2" FPT.

Write for a copy of our latest catalog.

Electrimatic

2100 INDIANA AVENUE
CHICAGO 16, ILL.

MATCH the
PROTECTION
TO THE
HAZARD!



**INDUSTRIAL
GAS MASK**

FOR

METHYL CHLORIDE

USE THE GMA CANISTER

SULPHUR DIOXIDE

USE THE GMB CANISTER

AMMONIA

USE THE GMD CANISTER

The M. S. A. Industrial Gas Mask offers complete respiratory protection against each of the three common refrigerants when the correct specific canister is employed. Canisters are interchangeable and afford maximum protection. Easy to wear, safe, comfortable! Write for Bulletin ED-7.

MINE SAFETY APPLIANCES CO.
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PA.

District Representatives in Principal Cities

also active in the oil and food industries in this country and in several industrial companies in Central America.

As a part of his new program for Alco Valve, Mr. Maguire has announced his intention to increase the capital of the company to provide a greater interest for continued postwar planning and to expand Alco's production along the lines of its regular business. Emphasis will be placed on increased shipments to jobbers and greatly increased sales engineering efforts.

Mr. Maguire said that in addition to its various contributions production-wise to the war effort in novel products with which all were unfamiliar at the outset, Alco has managed to preserve its basic structure in the refrigeration and air conditioning industry. The company has attained and maintained its position in the field of highly technical automatic controls and it is their purpose during the ensuing months and years to continue this policy so that it may expand and grow as the continued logical leader in its field.

KEROTEST OPENS NEW WAREHOUSE FOR PACIFIC COAST

AS A MEANS of improving its methods of distribution in the Pacific Coast area, Kerotest Manufacturing Company, Pittsburgh valves and fittings manufacturer, announces the establishment of a new warehouse at 3311 East Slauson Avenue in Los Angeles, with J. A. Swaton as district manager for steel valves and J. A. Norris as district manager, brass division.



J. A. SWATON J. A. NORRIS VAN D. CLOTHIER

Mr. Swaton, with Kerotest for over twenty years, and Mr. Norris will maintain headquarters in the new warehouse and the latter will coordinate all activities throughout the entire Pacific Coast area.

Van D. Clothier will continue as the southern California representative for Brass Valves with headquarters at 1015 East 16th Street, Los Angeles, California.

OBERC TO DISTRIBUTE MONITOR LINE IN MICHIGAN

J. M. OBERC, Inc., of Detroit has been selected as a distributor for the products to be marketed by Monitor Equipment Corp., New York, in Wayne, St. Clair, Macomb, Oakland and Washtenaw counties. This territory embraces the Detroit-Michigan, metropolitan and surrounding area.



J. M. Oberc and Ralph A. Day of J. M. Oberc, Inc.

Monitor Equipment Corp. was formed by a group of distributors, and has contracted to market nationally the home appliances to be produced by 24 factories, as soon as these plants can be converted from war production. The products of these various independent producing elements will be marketed under the "Monitor" trade name.

J. M. Oberc, Inc. was formed in 1933 as one of the first independent refrigeration parts and supply wholesaling firms in the country. J. M. Oberc, head of the firm, declared that the Monitor Home Appliances Division and the Wholesale Parts Division will be operated as two distinct and completely independent operations, and that there will be added later a third independent commercial equipment division.

Ralph A. Day will become merchandise manager for the company as of Sept. 1, Mr. Oberc stated. Mr. Day, a native of Detroit, was educated in the engineering school at the University of Michigan, and joined Kelvinator in 1927. He has been with that company for seventeen years, starting as a retail salesman.

Before establishing his own business in 1933, Mr. Oberc had been with Kelvinator from 1928 to 1929, and from 1929 to 1933 was with F. B. Riley & Associates, Manufacturers' representatives in the refrigeration field.

**ARE YOU
Equipping a new Serviceman**

Equipping a new Truck

Going back into Service Work

?

We have prepared a very helpful list of items suggested as a minimum stock. Several lists are available. Check the ones you want.

- Service Tools
- Parts for Domestic Service
- Parts for Commercial Service

Use your letterhead and send your inquiry to Dept. A.

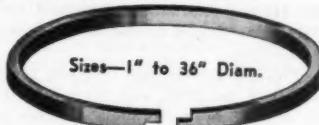
**T
H
E
R
COMPANY
A
L INC.**

St. Paul, 4, Minn.
University at Raymond
Milwaukee, 3, Wisc.
749 No. Seventh St.
Des Moines, 9, Iowa
907 Locust Street
Cedar Rapids, Iowa
503 Fourth Ave. S.E.
Great Falls, Mont.
306 First Ave. South

For a Long Time **25 YEARS**

AUTO-DIESEL
HAVE BEEN MAKING QUALITY RINGS

Down through the years AUTO-DIESEL "Ladie Tempered" Piston Rings have been used as original equipment and replacement for Diesel powered units of all types—stationary and mobile units and hydraulic and pneumatic operated industrial equipment. Many firms have found them so satisfactory that they are used as standard equipment. The reason for satisfactory performance is that it has always been our policy to make the best ring possible—to make a QUALITY product.



Sizes—1" to 36" Diam.

Write for Information

THE AUTO-DIESEL PISTON RING CO.
3157 Superior Ave. CLEVELAND 14, OHIO

QUALITY RINGS SINCE 1921



Some men in some jobs in refrigeration face the prospect of running into a blind alley in their work.

Because of limited knowledge and skill, they can progress only so far, then—**DEAD END!**

The U.E.I. Program of **BALANCED TRAINING** (home-study instruction *balanced* with actual shop practice) is planned to help men duck the dead ends!

**U.E.I. BALANCED
TRAINING**



is the refrigeration and air conditioning training which has been proving its value for the past 17 years. To men who know they are at present headed for the dead end, using the coupon below represents Step No. ONE in a new direction.

How about using the coupon **RIGHT NOW?**

FREE FACTS	UTILITIES <i>Engineering Institute</i>
1314 W. Belden Ave. Dept. 45, Chicago 14, Ill.	
Please give me more information about Refrigeration and Air Conditioning Training, as promised in your Refrigeration Service Engineer August, 1945 ad.	
Name	
Address	
City Zone State	

ANDERSON NAMED TO WESTINGHOUSE APPLIANCE DIVISION POST

J. J. ANDERSON has been appointed J. J. ANDERSON assistant service manager of the Electric Appliance Division of the Westinghouse Electric Corporation, Mansfield, Ohio, according to an announcement by L. K. Baxter, service manager.

Mr. Anderson, with the exception of two years he served as an ordnance specialist, has been identified in the air conditioning and commercial refrigeration field with Westinghouse since 1937. For three years he was supervisor of commercial refrigeration for Westinghouse in Ohio, parts of Pennsylvania, Kentucky and Michigan.

Mr. Anderson was transferred in November, 1944, to New York as supervisor of the refrigeration specialties department, working in the New England states as well as New Jersey and New York, which position he held at the time of his present appointment.

*** UTAH PRODUCTS MERGES WITH UNIVERSAL COOLER

A PROPOSAL to merge Utah Radio Products Company, Chicago, and Universal Cooler Corporation, Marion, O., into International Detrola Corporation has been approved by the Boards of Directors of all three companies. "Meetings of stockholders to vote on the proposal will be held soon," C. Russell Feldmann, Detrola president, said.

The program provides for exchange of one Utah share for six-tenths of a share of Detrola, one share of Universal Cooler Class A no-par stock for one of Detrola, and one share of Universal Cooler Class B no-par stock for one fourth of a share of Detrola.

International Detrola, which recently acquired controlling ownership of Rohr Aircraft Corporation, California producer of aircraft power plants and sub-assemblies, normally manufactures home and automobile radio receivers, automatic record changers, other electronic items, and machine tools. It has plants in Detroit, Elkhart, Ind., and Indianapolis.



J. J. ANDERSON

KIRK JOINS LIQUID CARBONIC

FRANK D. KIRK, formerly sales manager for Vilter Manufacturing Company, has joined the sales department of Liquid Carbonic Corporation as cabinet sales supervisor in the company's fountain - cabinet division. He will have headquarters in Liquid's Chicago office and will cover the company's northwest and southwest fountain cabinet sales divisions. The territory includes fifteen midwestern and southern states. He will specialize on ice cream cabinet sales, a field which Liquid invaded in 1938.

A veteran of 20 years in refrigeration, Frank Kirk helped pioneer household mechanical refrigeration as a member of Frigidaire's field organization. He turned to industrial refrigeration in 1934 when he joined Vilter Manufacturing Company. He also served as a member of the WPB advisory committee for the refrigeration industry.

WEATHERHEAD ENGINEERS ELEVATED

THE appointment of J. F. Campbell as chief development engineer and R. W. Phillips as laboratory director has been announced by N. Paquin, director of engineering for The Weatherhead Company.

As Weatherhead's chief development engineer, Mr. Campbell will conduct the Weatherhead development program, continuing along present plans and introducing new experimental work. He will be assisted in the execution of this program by Ralph Erskine of the development engineering staff who was named assistant development engineer. He is a graduate of Purdue University where he obtained his degree in mechanical engineering.

Mr. Phillips joined the company's engineering staff in 1941 and was placed in charge of the hose division. In his new position, he will direct operation of the entire Weatherhead laboratory and will be assisted by Robert Paec. Mr. Phillips is an alumnus of the Graduate School of the University of Michigan.

THE ANSWER TO EVERY SERVICE
MAN'S PROBLEM OF MOISTURE IS
ANSUL

ICE-X



ICE-X quickly cures emergency freeze ups
when ice forms at the expansion valve or
capillary tube. Harmless to use. Great for
Freon, Carrene, or Methyl Chloride sys-
tems...The dependable liquid anti-freeze.

ORDER FROM YOUR JOBBER OR—

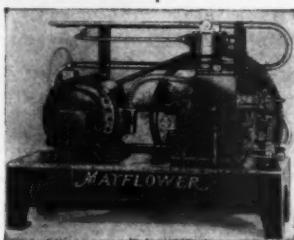


EXCLUSIVE NATIONAL DISTRIBUTOR

THE HARRY ALTER CO. 1728 S. MICHIGAN AVE.
CHICAGO 16, ILLINOIS

JOBBERS: WRITE FOR SPECIAL PROPOSITION!

MAYFLOWER
UNITS AND PARTS



COMPLETE stocks of genuine
Mayflower air and water-cooled
Condensing Units, and all Mayflower
Parts, are now available to meet your
priority requirements. Service men,
consult your jobbers, or write us di-
rect. Jobbers, we solicit your in-
quiries.



MAYFLOWER
PRODUCTS, Inc.
13 S. 5th St.
Richmond, Ind.

**DO IT
TODAY!**

The sooner you get your
copy of the NEW 1945

AIRO
Wholesale

CATALOG

of Refrigeration and Air Conditioning
PARTS — TOOLS — SUPPLIES

the sooner you'll understand
why "you'll like to buy
from Airo Supply."

*Write today on your
letterhead, please*

AIRO SUPPLY CO. (NOT INC.)
WHOLESALE ONLY
2732 N. Ashland Ave., Dept. A
Chicago 14, Illinois

GENERAL CONTROLS APPOINTS DALLAS MANAGER

V. C. KNEESE has been appointed manager of the Dallas Factory Branch of General Controls Company, Glendale, Calif. Mr. Kneese has had over 10 years' experience as purchasing agent and accountant in the wholesale plumbing and hardware business and with Associated Mechanical Contractors. He attended Schreiver Institute at Kerrville, Texas, where he received an AA degree in Business Administration. He also studied business administration at the University of Texas. As manager of the Dallas Factory Branch, he will devote his entire time to serving users of automatic controls in the heating, refrigeration, aircraft and industrial fields throughout the northern half of Texas, Oklahoma and Arkansas.

NEW REFRIGERATION CATALOG

THE publication of a new refrigeration catalog completely describing the many new and improved Weatherhead Refrigeration products has been announced by The Weatherhead Company, Cleveland 8, Ohio. This catalog, illustrated in two colors, shows in cross-section and exploded views all of the various parts furnished by this company. It is divided into six sections describing valves, dehydrators, strainers, manifold assemblies, accessories and fittings. Complete technical information including part numbers, size information and list prices is also shown. It can be obtained by any interested party by writing on their company stationery.

BULLETIN ON LEAK DETECTOR

A BROADSIDE on a new product, "Trace," has been issued by the High-side Chemicals Co., Newark, N. J. "Trace" as its name implies, is used to trace small leaks in a refrigerating system. It is concentrate of color compounded with a fine grade lubricating oil of suitable viscosity. Added to a refrigeration system, it travels with the oil and refrigerant and at the point of leakage leaves a red stain easily identified on the exterior of the system. The broadside gives brief directions on use and other details. A more detailed folder on this product will be off the press soon and will be sent to interested parties upon request.

VINCENT BRASS APPOINTS CONTROL MANAGER

ANTICIPATING increased activity in the post war market for automatic controls, Vincent Brass & Copper Co., Inc. of Minneapolis, Minn. recently named Edmund T. Dowd as manager of their control division. A graduate of the University of Minnesota, Mr. Dowd is an experienced engineer well-versed in the application of automatic controls. Before joining Vincent Brass, he was sales engineer with Minneapolis Honeywell for approximately nine years.

Vincent Brass are sole distributors in the Minnesota, No. Dakota, So. Dakota and parts of northern Wisconsin territory for automatic controls built by Penn Electric Switch Co. of Goshen, Ind. The Penn line includes automatic controls for heating, refrigeration, pump and air compressor service as well as safety controls for internal combustion engines.

RANCO OPENS MID-WEST OFFICE

RANCO announces that J. D. (Joe) Merkle, formerly assistant sales manager, has opened an office in Room 806, South Side National Bank Bldg., 3606 Gravios Ave., St. Louis 16, Missouri.

Mr. Merkle is well known to the refrigeration trade having been connected with Ranco for the past seventeen years. This St. Louis office will serve the Mid West area for Ranco, Inc.



J. D. MERKLE

JACK CAMERON WITH WHITING

THE appointment of John R. Cameron, 11613 Santa Rosa, Detroit Mich., as representative in the State of Michigan for the White Stoker Sales Co., Chicago, Ill., manufacturers of domestic and commercial stokers, has been announced by A. E. Bottenfield, executive vice-president and general manager. Mr. Cameron is well known nationally, having for the past sixteen years held the position of national service manager of Norge Division, Borg-Warner Corp.

PUT RUST TO WORK!

Brush or spray Nobs Glazecote directly on rust. Rust aids in forming a permanent thermo-plastic coating that is not affected by water, alcohols, dilute acids, or alkalies. Prevents further rusting. Stands heat to 400° F. Covers about 300 sq. feet per gallon.

Price \$3.50 per gal. F.O.B. Los Angeles

NOBS CHEMICAL COMPANY

2465 East 53rd Street, Los Angeles 11, Calif.

Seattle

San Francisco

WRITE FOR CATALOG



Due to the paper shortage we will not issue a catalog in 1945.

SERVICE PARTS COMPANY
2512 Lake St.
Melrose Park, Ill.

Speed up

YOUR REFRIGERATION SERVICE

3 Tools in ONE...JUSTRITE



1. A gas leak detector for systems which use Freon, Carrene and other non-combustible Halide gases. 2. A light-weight "Power-Flame" soldering set for repairing connections or wiring. 3. A blow torch for "sweating" joints.

Quickly convertible. All parts built of the finest material.

Available now for priority orders. Ask your jobber.

JUSTRITE MANUFACTURING CO.
2063 No. Southport Ave., Dept. B-7, Chicago, 14, Ill.

It's the PLUS Value that Counts!

• Full value of a product is not always reflected in the quality of that product or the price paid.

Plus Value is made up of a lot of little things. Things like courteous treatment—dependable service—the guar-

antee of satisfaction—and the feeling your business is wanted and appreciated.

These are the hidden values that count . . . they are the hidden values that go with each purchase from KRAMER'S.

FRED C. KRAMER COMPANY
212 N. JEFFERSON ST., CHICAGO 6, ILL., RANDOLPH 6288
Member National Refrigeration Supply Jobbers Association

TESTING AND CHECKING OF REFRIGERANT VALVES

IN VERY few fields of production is a more thorough testing and checking job done than in the manufacture of refrigerant valves.

As a typical example of precision testing methods employed by valve manufacturers, fully two-thirds of the entire payroll of the Automatic Products Co. of Milwaukee, Wis., makers of "A-P" refrigerant valves and controls, is expended for testing service. As a result of this thorough testing, the user of the valve is frequently able to install it on equipment without need to touch the factory-set adjustment.

The minuteness of this testing and checking is well illustrated by the inspection given to finished valve bodies, for "A-P" maintains that the bodies of their expansion valves must be as nearly perfect as human ingenuity can make them. A dense brass forging, the valve body is put through every conceivable test. There are more than a dozen types of inspection—for every kind of measurement, hole size, thread size, interior clearance. Where required dimensions must be accurate to within thousandths of an inch—an infinitesimal tolerance.

When fully assembled, the valve is connected to air pressure of 425 lbs. and tested for leakage. The bulb is immersed in hot water at 165 degrees F., which serves to put an extreme strain on the diaphragm and needle, and if there is any weakness in the valve, it will develop during this test.

The charging period of the valve is a decidedly difficult operation, requiring periodic readings and recordings to insure keeping the vacuum requirement constant.

With an alert eye on a water filled cup, and sensitive fingers on the valve and gauge, the operator "seats" the valve needle to thousandths of an inch accuracy. Subsequent tests and calibrations further check this needle setting.

Each valve spends a period of over three weeks in a special 115 degree "hot room" in which it must withstand the stress of extreme temperatures over this long period of time. Then it is again rechecked against its recorded calibration, tested, inlet and outlet sealed, and packed for shipment. Each valve is registered at the factory with a definite record of performance, to insure its operating with efficiency, accuracy and economy on the air conditioning or refrigeration unit or installation for which it is designed.

In connection with the recording for permanent filing, just before this is done each valve is given a final "Cold Water and Calibration Test." Then each valve leaving the "A-P" plant has an individual operation record, showing minimum heat, maximum superheat, pressure drop, short charge, overcharge, and other important information.

FEDDERS-QUIGAN COMPANIES PLAN MERGER

ALTHOUGH details have not been worked out, "we are definitely planning a merger or consolidation of the Fedders Manufacturing Co. Inc. of Buffalo with Frank J. Quigan, Inc., Maspeth, L. I., in about 90 days," Frank J. Quigan, chairman of the companies, announced.

Present plans call for the purchase or lease by Fedders of the physical assets of the Quigan concern, Mr. Quigan declared. "Fedders definitely will continue to be the main company, doing the main part of the business of the consolidated concerns although we may change the Fedders name to Fedders-Quigan Inc.," Mr. Quigan said.

"In addition, we are considering the addition of one or two additional companies. By 1947 we expect to be doing a business of \$20,000,000 a year. Fedders itself never did a business of more than \$9,000,000 a year.

He said the company, in addition to making refrigeration equipment, is planning on entering the home air conditioning field.

BEN-HUR AWARDED FOURTH ARMY-NAVY STAR

FOR the fourth time, the Ben-Hur Manufacturing Co., 634 E. Keefe Ave., Milwaukee, has been honored with an Army-Navy "E" Award for production proficiency, adding a third star to the "E" Pennant.

The Ben-Hur organization is engaged in building heavy-duty 2-wheel utility trailers for army transport use, as well as specially designed 250-gal. water tank trailers. The tanks of these trailers are fitted with faucets and pump, and are used for transporting drinking water to troops in areas where good drinking water is unavailable or difficult to obtain.

In building and delivering these trailers, Ben-Hur has set records for quality and speed of production that have repeatedly earned the commendation of army-navy officials.

**LEARN HOW
AIR CONDITIONING AND
REFRIGERATION**

JUST OUT!
**HEATING - COOLING
and
AIR CONDITIONING**

This new non-technical book covers every phase of the Air-Conditioning-Heating and Refrigeration fields. Nothing is omitted. Complete and authoritative. Actually four books in one. A few of the subjects covered include: Cooling Loads & Calculations; Cooling with Refrigerants or Chilled Water; Circulation of Air; Selection and Sizing of Equipment. 706 Pages, 64 big charts and 351 illust.

Send Today ONLY \$4.00

USE THIS COUPON

Gateway Book Company, Dept. R-2
32 N. State, Chicago 2, Ill.

Please send me this new Air Conditioning Handbook for \$4.00 enclosed. I understand that if I am not satisfied with it, I may return it in 5 days and my money will be refunded.

Name
Address
City State

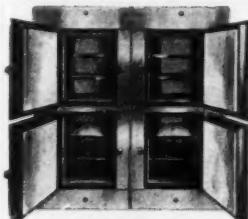
**HAVE YOU READ THE
SERVICE POINTERS
SUBMITTED BY READERS OF THIS JOURNAL?**

In this department you will find many ideas designed to help you in these days of material shortages.

Help us to maintain this mutual exchange of ideas!

If you have not already done so, we suggest that you read the Service Pointers in this issue. Then sit down and let us have your own ideas. Address "Service Pointers".

The REFRIGERATION SERVICE ENGINEER
433 N. Waller Ave. Chicago



ZEROSAFE
Model FF-80. Cap.: 60 cu. ft.
SIZES FOR EVERY NEED.

YEARS AHEAD . . .

ZEROSAFE by Wilson is the FIRST and ONLY Reach-In Farm Freezer PROVED by years of use since 1939 to have

- Capacity for Full-Scale home freezing and storing of foods
- Rugged strength for constant Daily Use Year After Year
- Convenience of Design For Real Usability
Write Dept. 14 for Details NOW:

WILSON CABINET COMPANY, SMYRNA, DELAWARE

INCREASE YOUR PROFITS!

Save running around for your refrigeration supplies. We carry complete stocks. Try us and become a regular Chase customer.

DISTRIBUTORS FOR

Brunner Condensing Units
Betz Blowers

Delco Motors and Parts
Universal Cooler Parts

CHASE REFRIGERATION SUPPLY CO., Not Inc.
546-48 W. 119th St. Chase Building Chicago 28, Ill.

GASKETS



Write for complete catalog.

CHICAGO-WILCOX MFG. CO.
7701 Avalon Ave. Chicago 19, Illinois

Until Victory is won, war orders come first. Today, our gasket service for every refrigeration need in helping speed war production. Under these conditions, delays in filling other orders are unavoidable.

SEND FOR
1945
CATALOG
READY FOR MAILING
Now
G & E
EQUIPMENT
SUPPLY COMPANY
400 N. Sangamon Street
CHICAGO 22, ILL

CATALOG No. 115 SPRINGS and SUSPENSION 2445

CONTROL REPAIR SERVICE

Domestic Controls reconditioned equal to new at a small cost. All work guaranteed for one year. Prices upon request.

United Speedometer Repair Co.
342 W. 70th Street
New York City 23

SERVICE MEN— ADDED PROFITS ARE POSSIBLE

Eliminate the lost time from service calls by using our repair service on compressors. We specialize in prompt efficient workmanship on your compressor repairs. 90 day guarantee—Reasonable prices.

We do not repair Hermetic units.
Write for quotations to
Keystone Engineering Corp.
844 Keystone Ave., Chicago 51, Ill.
Phone: BELmont 5635

A
PERFECT
ROTARY
SEAL JOB
ASSURED
WITH
SCHULTZ
SEAL
RING
PULLER

PRICE
\$1.95



THE LONG THIN JAWS PULL THE TOUGHEST SEAL RING WITHOUT MARRING THE SHAFT ESPECIALLY USEFUL TO PULL INSIDE NORGE SEAL RINGS

For Sale by Your Refrigeration Jobber
—OR—
REFRIGERATION SERVICE, INC.
3109 BEVERLY BLVD., LOS ANGELES 4, CALIF.

HAVE YOU TRIED Automatic LATELY

Many items are now in stock that were previously not available. Do not fail to ask us for those special tools or parts that you have been unable to get.

Distributor for
PAR CONDENSING UNITS
809 WEST 74TH STREET

Automatic
HEATING & COOLING SUPPLY
(DIVISION OF WEIL-MCLAIN COMPANY)
647 W. LAKE ST. CHICAGO 6, ILL.

Phone: CENTral 2061

A photograph of a large, rectangular metal parts bin. The bin has a label that reads "HASCO, INC. GREENSBORO, N.C." at the top. Below this, it says "HASCObILT Parts" in large letters, with "Part No. 7-9" written next to it. A curved line contains the text "Packed in Special Cardboard Boxes or Containers". Below the bin, there is descriptive text: "Offers (1) Complete inventory record. (2) Part numbers always visible. (3) Easily stored in bins or on shelves." At the bottom, it says "Write for illustrated catalog and price list." and "HASCO, INC. GREENSBORO, N.C."

A graphic illustration of a white door with a dark frame. The words "Check DOOR GASKETS ON EVERY JOB" are written in large, bold, black letters across the center of the door. At the bottom, there is a stylized logo consisting of a letter "J" and the text "JARROW PRODUCTS 420 N. LA SALLE ST., CHICAGO 10, ILLINOIS".

A large, bold headline "STANGARD" is centered above the words "Prime Surface COLD PLATES". On either side of the main text are small illustrations of a man in a suit. Below the main title, it says "For Maximum Refrigerating Efficiency". At the bottom, it lists "THE STANGARD DICKERSON CORP. 46-76 Oliver Street • Newark 5, N.J."

COMING FLOCO "FLOTUBES"

(EXTERNALLY ADJUSTABLE)

NO VALVES—NO STUFFING BOXES
ALL SIZES FOR ALL SINGLE CIRCUIT JOBS

REPLACES AUTOMATIC
EXPANSION VALVES

FLOW CONTROLS, INC.
1821 W. NORTH AVE.
CHICAGO 22, ILL.

YOU can depend on BLYTHE

to have parts and supplies when you need them. Our stock is maintained to assist you in rendering the rapid service your customers require.

An inquiry for parts and prices sent on your letterhead will be immediately answered.

H. W. BLYTHE COMPANY

2334 So. Michigan Ave. Chicago 16, Ill.

WEST COAST CONTROL SERVICE

Cold Controls • Pressure Switches

One year guarantee
on all repairs

Original Factory Specifications

UTILITY THERMOSTAT CO.

4011 Halldale Ave., Los Angeles 37, Calif.

AUTOMATIC EXPANSION VALVES

repaired or exchanged
at \$1.75 F.O.B. Chicago



Until further notice we will be unable
to accept other types of repair work.
ALL WORK GUARANTEED FOR 90 DAYS

NEW DUTY
2424 Irving Park Blvd., CHICAGO 18



SECTION OF COMMERCIAL TRADES' SHOP

TRAIN WHERE THE ARMY TRAINED

Learn Domestic and Commercial Refrigeration
and Air Conditioning Maintenance & Service.

Full or part time Residence course or
Combination Home Study & Shop training.

VETERANS - Commercial Trades Institute
is approved for GI training

Write for free Descriptive booklet
COMMERCIAL TRADES INSTITUTE

CHICAGO, ILLINOIS
209 W. Jackson Blvd. BIRMINGHAM, ALA.
200 S. 20th St.

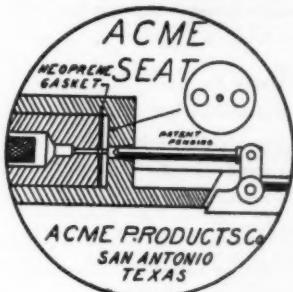
SERVEL

BUILDS GOOD WILL

The economical operation and dependability of sturdy Servel Commercial Condensing Units are helping you build a sound base for post-war sales. To assure continued good will on the part of your customers, use genuine Servel Parts whenever repairs are necessary.

SERVEL, Inc.

Electric Refrigeration and Air Conditioning Division
Evansville 20, Indiana



Controls Repaired & Rebuilt

Just Mail In Controls — We Handle The Best
COMMERCIAL—DOMESTIC—
INDUSTRIAL

One Year Guarantee

Each Control Reset and Cycle Tested

Domestic Coil Controls (Modern Type).....	\$2.00
Commercial Controls (Hum. or Temp.).....	1.50
Commercial Dual Controls.....	2.00
Automatic Water Valves.....	2.00
Automatic Expansion Valves.....	1.75
Thermostatic Expansion Valves.....	3.00

All Prices F.O.B. Chicago and subject to change without notice.

ACME CONTROL SERVICE
5525 Lawrence Avenue—Chicago 36, Illinois
Phone PENnsylvania 5-583



ASK
TO
SEE
IT!
AIR CONDITIONING

REFRIGERATION
Just Out! AUDEL'S REFRIGERATION & AIR
CONDITIONING GUIDE—for Engineers, Ser-
vicemen, Shopmen. Covering Principles, Ser-
vicing, Operation & Repairs of Household, Special,
Commercial, Industrial Units & Air Conditioning
1280 Pages. Illustrated. Valuable Facts & Fig-
ures. Get this information for yourself! Mail
Order Today. Money Back If Not Satisfied!
AUDEL, Publishers, 49 W. 23rd St., N. Y. 10

4
COMPLETE



Remanufactured

AIR-COOLED
CONDENSING UNITS

1/4 H.P. to 1 1/2 H.P.

COMPLETE WITH SINGLE PHASE
MOTORS

60 Cycle 110-220 V.

ALSO

FROSTED FOOD CABINETS

EDISON COOLING CORP.
310 E. 149th St. N. Y. 51, N. Y.



THE HARRY ALTER CO.

* 1728 S. Michigan Ave.
Chicago, Ill.

Two Big Warehouses
to Serve You

134 Lafayette St.
New York, N. Y.

Index to Advertisers

Acme Control Service	95
Acme Products Co.	95
Aerovox Corp.	81
Airco Refrigeration Parts	94
Airo Supply Co.	87
Alco Valve Co.	6 and 7
Alter Co., The Harry	87 and 95
Ansol Chemical Co.	1
Audel & Co., Theo.	69
Auto-Diesel Piston Ring Co., The	85
Automatic Heating & Cooling Supply Co.	93
Automatic Products Co.	48 and 49
Blythe Co., H. W.	94
Bonney Forge & Tool Works	Back Cover
Brunner Mfg. Co.	61
Chase Refrigeration Supply Co.	92
Chicago Seal Co.	Inside Front Cover
Chicago-Wilcox Manufacturing Co.	92
Commercial Trades Institute	94
Davison Chemical Corp.	Inside Back Cover
Day & Night Mfg. Co. (Cooler Div.)	79
Detroit Lubricator Co.	2 and 3
Dole Refrigerating Co.	79
Du Pont de Nemours & Co., E. I. (Electro-chemicals Dept.)	10 and 11
Edison Cooling Corp.	95
Electramatic	83
Flow Controls, Inc.	94
G & E Equipment Supply Co.	92
Gateway Book Co.	91
General Controls	57
Hasco, Inc.	93
Henry Valve Co.	16
Hightide Chemicals Co.	14 and 15
Imperial Brass Mfg. Co.	5
Jarrow Products	93
Jolice Chemicals, Ltd.	55
Justrite Mfg. Co.	89
Kelvinator (Div. of Nash-Kelvinator Corp.)	65
Kerotest Mfg. Co.	92
Keystone Engineering Corp.	92
Kinetic Chemicals, Inc.	89
Kramer Co., Fred C.	89
Kramer-Trenton Co.	53
Logan Engineering Co.	75
Lynch Mfg. Corp.	69
Mayflower Products, Inc.	87
McIntire Connector Co.	22
Mills Industries, Inc.	20
Mine Safety Appliances Co.	83
Minneapolis-Honeywell Regulator Co.	71
Modern Gas Co., Inc.	81
Mueller Brass Co.	131
New Duty	94
Nobs Chemical Co.	89
Peerless of America, Inc.	67
Ranco, Inc.	18
Refrigeration Maintenance Corp.	77
Refrigeration Service, Inc.	92
Sanitary Refrigerator Co.	77
Servel, Inc.	95
Service Parts Co.	89
Sporlan Valve Co.	17
Stangard Dickerson Corp.	93
Superior Valve & Fittings Co.	12
Tecumseh Products Co.	51
Temprite Products Corp.	8
Thermal Co., Inc.	85
United Speedometer Repair Co.	92
Utilities Engineering Institute	85
Utility Thermostat Co.	94
Virginia Smelting Co.	4
Weatherhead Co., The	73
Western Thermal Equipment Co.	91
White-Rodgers Electrical Co.	59
Wilson Cabinet Co.	91

Classified Ads

Rate: Two Dollars for fifty words or less,
30 cents for each additional ten words or less.

FOR SALE—Remanufactured air and water-cooled condensing units. $\frac{3}{4}$ h.p. up to $1\frac{1}{2}$ h.p. Frosted food & ice cream cabinets. Edison Cooling Corp., 310 East 149th St., New York 51, N.Y.

FOR SALE—Brand new dehydrators and filters. Due to a fortunate purchase, I am in a position to furnish a limited quantity of new dehydrators in sizes from 2" to 8". Also have filters from a cubic inch to 28 cu. in. Write for price list and save yourself some money. R. O. Lauer, 115 N. Keswick Ave., Glenside, Pa.

YOUR OPPORTUNITY FOR A FINE POSITION—If you know refrigeration and have some knowledge of air-conditioning, here is your chance to get a really fine position. We need two qualified men to act as instructors in our modern refrigeration school. Permanent year 'round position. \$75.00 for 40 hour week. No Saturday work. If you have the goods, here is your chance to get out of the rut and into a professional position. Write full qualifications.

and send picture of yourself in first letter. Boston Technical Institute, 4707 Euclid Ave., Cleveland 3, Ohio.

FIRST CLASS ELECTRICAL WIRING SERVICE
FOR REFRIGERATION AND AIR-CONDITIONING
JOBS. GREATER CHICAGO AREA ONLY (ESTAB-
LISHED 1930). HELMUTH ELECTRIC CO., 1732 N.
KEDZIE AVE., CHICAGO 47, ILL. PHONE ALBANY
~~9056~~

WANTED—REFRIGERATION SERVICE MEN. We offer steady employment. High wages, plus Car Allowance and Commissions on new equipment sales to experienced domestic and commercial servicemen. Excellent opportunity for advancement. Make arrangements now to work for a large, long established Service Company holding service contracts with national manufacturers, such as Kelvinator, Stewart-Warner, Hot Point and others. Write us today, giving experience, background, and other pertinent details. Murphy & Miller, Inc., 1326 S. Michigan Ave., Chicago, 5, Illinois.

DAVISON'S SILICA GEL



goes further...does more

Davison's Silica Gel was developed under close collaboration with refrigeration engineers who knew only too well the short-comings of ordinary drying agents... Recognized as a basic contribution to the refrigeration industry, Davison's Silica Gel ends moisture troubles and other danger-creating elements that stop most drying agents. Davison's is the complete drying agent, as these advantages prove.

- 1 It is processed especially for the dehydration of refrigerants.
- 2 Its scientifically-determined particle size assures you that the refrigerant will not channel—will be distributed evenly throughout the cartridge.

- 3 This even distribution of the refrigerant makes it possible for it to be in complete contact with the entire pore surface area at all times.
- 4 It removes acids . . . corrosive compounds and other impurities . . . in addition to moisture—instantly.
- 5 Its capacity for moisture is not affected by oil.
- 6 It will not coke nor powder.
- 7 It will not attack metals or alloys.

To get this COMPLETE DRYING AGENT that is effective on Freon, Methyl Chloride, Sulphur Dioxide, etc., specify Davison's Silica Gel from your jobber—in factory-charged dehydrators or in bulk for refill.

THE DAVISON CHEMICAL CORPORATION
Progress through Chemistry



BALTIMORE-3, MD.

Canadian exclusive sales agents for DAVISON'S SILICA GEL:

CANADIAN INDUSTRIES LIMITED General Chemicals Division

Bonney Tools

help good mechanics
do better work

Every mechanic knows how important it is to have the right tools for every job. Take those close, side-clearance jobs, for instance. They're a cinch with Bonney thin-walled, pull-broached Box Wrenches that are designed for jobs like that. Bonney open-end Wrenches with pear-shaped heads and accurately milled openings, are the answer in those mean spots where there's hardly any space above the nut. Hard-to-reach places aren't hard to reach when you use Bonney custom-hardened Sockets and Attachments.

Every tool in the complete Bonney line is designed to make work easier for the mechanic. No wonder they're such favorites with men who know good tools. Ask your nearest Bonney Jobber or Distributor about them.

BONNEY FORGE & TOOL WORKS

In Canada: Gray-Bonney Tool Company, Ltd., St. Clair & Reycs Aves., Toronto



BUY WAR BONDS
AND KEEP THEM